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YAWS.

SPITTEL (R. L.). **Parangi.**—*Jl. Ceylon Branch of the Brit. Med. Assoc.* 1922. May–Aug. Vol. 19. Pt. 2. pp. 1–14.

This is a complete account, written by a master of his subject, of yaws, or parangi, as it is called in Ceylon (= foreigner, signifying its extraneous origin); the author admits that it contains little that is new, but he finds the text-book accounts unsatisfactory.

In a series of 32 cases the primary sore was on the foot or ankle in 18; only once in some hundreds of cases has he seen it on the penis. After full consideration of the primary and secondary stage, he comes to the quiescent period, which usually lasts from 4 to 12 years before tertiary symptoms appear. He has known instances of latent periods of 25 and 30 years and calls attention to the risk of speaking of the cure of such a disease after a relatively short observation period.

The most valuable part of his paper is that which concerns the tertiary stage, for there is a general impression that the lesions of this stage may be, or are, due to syphilis.

Tertiary yaws closely simulates tertiary syphilis and like it has two kinds of manifestations: (1) gummata; (2) fibroid induration; each the result of proliferative inflammation in response to a slow persistent biological stimulus. If there is manifest degenerative change the result is gumma, if not, fibroid induration. The clinical manifestations are gummatous infiltration (localized or diffuse in bones, fasciae, etc.), and serpiginous or lupoid ulceration of the skin and subcutaneous tissues (nodular cutaneous framboeside). The special characters of the tertiary eruptions are then considered.

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Bones.—Gummata or nodes are as common in yaws as in syphilis. Sometimes they break down, leaving banked indolent ulcers, followed it may be by superficial caries or necrosis of bone. In the long bones of the hands and feet the gummatous process is central and the condition suggests tuberculous dactylitis. Diffuse infiltration leading to osteo-sclerosis with bowing and deformity is very common in the tibia, less so in the fibula and ulna. Yaws, Spittel says, affects bones more extensively than does syphilis, especially those near the surface; he instances the tibia, malleoli, humoral condyles, radius and ulna, and the sites of muscular origins and insertions such as the epicondylar ridges of the humerus and the posterior surface of the os calcis. Other sites mentioned are the spine of the scapula and the clavicle, especially at the acromial end. Gummatous infiltration of the nose and palate produces all degrees of destruction from yielding of the septum to extreme forms of "gangosa" with hideous deformity.

Gummata of the Soft Parts.—Skin, subcutaneous tissues and fasciae are most frequently affected. The spirochaete seems to have a predilection for connective tissues. The infiltration may persist for months and then either become absorbed or fibrous, or break down leaving a punched-out ulcer. Secondary infection is common.

Nodular cutaneous framboeside.—Any part may be affected, but the favourite sites are the back, buttocks and limbs. Beginning in a papule which becomes a shallow ulcer the process of spreading and healing goes on for a prolonged time. "A nodule may take half to one year to break down, an area the size of the palm may take a year to be covered, fifteen years may elapse for the condition to spread from arm to forearm." In this it is unlike syphilis, but strongly resembles a skin tuberculide. The scarring and contraction of these lupoid framboesides often lead to crippling deformities.

After reference to juxta-articular nodes about the elbows, knees, hips and ankles, which are common in yaws but not in syphilis, and the rare condition of tertiary erythema, occurring as a rule in the sock area, the author comes to the *joints*. Synovitis and peri-articular inflammation are often seen. Joint movement may be limited, owing to various causes. Infiltrations of fasciae, tendon attachments and bursae are frequent.

The author has never met with definite nervous symptoms in yaws, but he thinks that the nervous system is affected mildly and transitorily in some cases. He knows no instance of congenital yaws; abortions do not take place even when the mother is heavily infected.

The *diagnosis* has to be made from syphilis and here laboratory tests give no help. We have to rely on the history of the case and the physical signs. In tertiary manifestations, which may just as well be syphilitic as framboesial, the type of patient is of assistance. The victim of yaws is a guileless villager not much the worse for his disease; the subject of syphilis is a more sophisticated town-dweller with health undermined. The lesions of yaws are more chronic and less actively destructive than those of syphilis. Syphilis usually does in a few weeks what yaws takes months or even years to do (nasal destruction is perhaps an exception). But apart from these the history is often the deciding factor, as the author illustrates by example.

He gives the following summary of differences between the two diseases :—

Parangi.	*Syphilis.*
1. Not congenital. No reciprocal immunity.	1. Congenital.
2. *Primary sore* extra-genital.	2. *Primary sore* usually genital.
3. *Secondary stage :* (*a*) Typical yaw pathognomonic. Furfaraceous desquamation and plantar lesions also characteristic. (*b*) Mucous membranes unaffected. (*c*) Itching common. (*d*) Alopecia unknown. (*e*) Eyes unaffected.	3. *Secondary stage :* (*a*) Syphilis seldom imitates these. (*b*) Mucous membranes often affected. (*c*) Itching rare. (*d*) Alopecia may occur. (*e*) Iritis common ; choroiditis and retinitis rare.
4. *Tertiary stage :* (*a*) Visceral lesions rare if they occur at all. (*b*) Nervous system scarcely ever seriously affected. (*c*) Blood vessels.—Perivascular infiltration and endothelial proliferation of intima not generalized as in syphilis.	4. *Tertiary stage :* (*a*) Visceral lesions occur, *e.g.*, pericellular cirrhosis, gummata of liver, testis, kidney. (*b*) Nervous system prone to infection ; myelitis, cranial nerve palsies, gumma of brain and spinal cord, tabes, G.P.I. (*c*) Endarteritis obliterans, thrombosis of cerebral arteries, arteriosclerosis, and aneurysm liable to occur.
5. Parangi is better resisted than syphilis : shown by—(*a*) slight constitutional disturbance ; (*b*) greater exuberance of eruption, scars more keloidal : (*c*) slower development of lesions.	5. Syphilis makes more serious wreck of the constitution, affecting more vital structures ; while parangi chiefly attacks connective tissues.
6. Does not respond well to mercury.	6. Responds well to mercury.

Treatment.—The author agrees with all observers that secondary lesions, recent tertiary lesions and lupoid ulceration yield promptly to salvarsan, but the response of long-standing ulcerations is often disappointing. Cauterizing or curetting may be necessary. Of chronic ulcers he writes :—

"Stimulating applications may be required, such as resin and turpentine ointments or Friar's balsam. Should these fail, firm pressure with a Martin's bandage worn all day and removed at night, and scraping or undercutting of the edges will establish conditions favourable to Thiersch grafting. The dressing I have found most useful after grafting relatively unhealthy discharging areas is one of perforated oiled-silk covered with gauze soaked in half-strength normal saline and firmly bandaged down. The dressing is kept continually soaked in the solution. Once or twice in twenty-four hours the gauze is changed ; but the oiled-silk is not touched for four or five days, when it will be found the grafts have taken well. After this, gauze soaked in half strength lotio rubra is applied over the oiled silk. This dressing is the best I know for any granulating surface, whether grafted or not."

Facial deformities afford much scope for rhinoplasty. As to neo-salvarsan the author gives 0·6 to 0·75 gm. to average males by intravenous injection at intervals of a week or ten days. The rule should be six injections in every case. After each injection the temperature is recorded till it is normal, the urine examined, and the skin carefully inspected for the least sign of irritation. No injection should be repeated till the patient is quite himself again. He gives iodides as well both by mouth and intravenously, just as mercury is nowadays given with salvarsan for syphilis.

He does not believe that a campaign to eradicate yaws can be conducted by inviting the natives to attend at central injecting stations. They must be visited in their homes, each series of villages four to six times. Such a scheme is now in operation in Ceylon. The author has seen many clinical recurrences within six months to six years of two to six large injections of both "606" and "914," in addition to courses of mercury and iodides. While not minimizing the difficulties, he looks forward to the ultimate extermination of yaws in Ceylon.

A. G. B.

Moss (W. L.) & Bigelow (G. H.). **Yaws. An Analysis of 1,046 Cases in the Dominican Republic.**—*Bull. Johns Hopkins Hosp.* 1922. Feb. Vol. 33. No. 372. pp. 43–55. With 8 plates of 30 photographs.

The authors, who are respectively Assistant Professor and Instructor in Preventive Medicine and Hygiene at the Harvard Medical School, visited Santo Domingo in 1920 by official request. Their report, which is presented in abstract, is a valuable one and is excellently illustrated. They begin with a sketch of the history of the island from 1492, when Columbus discovered it, to 1916, when the military occupation by the United States took place. External war and internal revolution have prevented the development of the island's resources and have occasioned neglect of education and sanitation. The following classification and abbreviations are used in the author's tables :—

"M. Madre buba, mother yaw, primary lesion.
"B′. Florid secondary eruption of granulomata. Early secondary stage.
"B. Sparse recurring secondary granulomata. Late secondary stage.
"C. Clavus. Late lesions on the soles. Late secondary stage.
"P. Palmar lesions. Late lesions on the palms. Late secondary stage.
"G. 'Gomma.' Tertiary stage.
"H. History of yaws. No active lesions present. Quiescent."

Primary Stage.—In 64 cases a primary lesion was present, and in 54 of these secondary lesions were present as well. With the object of elucidating the mode of transmission, in 969 cases the location of the madre was determined either by history, observation of the lesion, or scar (in 71 per cent. the scar was present) ; a table shows that in 83 per cent. the lesion was on the lower extremities, and in only 1 per cent. on the genitalia. Sexual transmission was thus excluded. Hereditary transmission was not seen. The authors think that the distribution of the madre excludes insect bite as the cause. An analysis of the location of the primary lesion on the lower extremities revealed that of the 803 no less than 705 were below the knee, which in a bare-legged population suggests trauma. The 705 lesions were then classed according as they were anterior, posterior, external or internal, and it was disclosed that the anterior led by a large majority, followed by the external surface, and that the posterior was easily last. This disposition is considered to correspond to exposure to minor traumata. The conclusion is not incompatible with the view that insects may be vectors of the virus.

Secondary Stage.—During the florid secondary stage 144 patients were seen, 38 of whom still showed the primary lesion, and 37 the late lesions of the soles known as clavus. It is believed that practically all patients in Santo Domingo develop granulomata on the soles

and become victims of clavus. The secondary eruption corresponded closely to the description given by CASTELLANI and CHALMERS. Only one case was seen in which mucous membrane was affected.

Clavus.—Of clavus patients in the late secondary stage there were 190. The granuloma on the sole shrinks and becomes a core, which finally drops out leaving the "nail hole"; the name clavus is also given to a honey-combed condition of the sole, and pain is characteristic of both. Fissures or cracks of the sole were occasionally seen, and these also are believed to be due to yaws. The authors were surprised at the effect of salvarsan in rejuvenating the old "moth-eaten" soles; the pain was relieved in a week and later all the old epidermis was shed, exposing healthy pink skin. There were 579 clavus cases, in 327 of which no other lesion was present.

Palmar lesions were encountered 68 times.

Studded Lesions.—Nodular lesions were observed, usually in the forearms and legs; they are thus described:—

"The individual lesion consists of a moderately hard skin nodule, 1 cm. in diameter, elevated 3 to 4 mm., not painful, unaccompanied by itching and without striking pigmentary changes until after regression, when increase of pigment may mark its former site. These nodules are thickly studded and regularly set over an area 8 to 10 cm. in diameter. The size of the area involved increases by an advancing margin consisting of an almost unbroken row of nodules. As this peripheral advance occurs, healing takes place in the center of the area. If the nodules do not ulcerate this retrogression is accompanied by desquamation of the epithelium. The nodules gradually flatten out and finally disappear, leaving no trace, or more often a circular area of increased pigmentation.

"In no case were the nodules observed to pass through a vesicular stage, but they frequently underwent ulcerative changes varying from very superficial ulceration involving only the individual nodules to extensive and deep ulceration which sometimes became confluent over large areas of the body and extended to the subcutaneous tissues. The degree and character of the resultant scarring probably depends upon the depth to which the ulceration had extended. Sometimes there remains only an increase of pigmentation, as mentioned above; sometimes the skin over the entire area involved was left thin and crinkly and in patterns like those which form on the surface of hot chocolate which has been thoroughly boiled and allowed to stand awhile. Again, where the ulceration has extended to a greater depth there may result complete leucoderma and sometimes painful keloid."

[This seems to be the nodular cutaneous framboeside of SPITTEL's paper.]

The authors are uncertain whether these should be considered as a late secondary or tertiary manifestation. They have notes of 37 cases; the average duration of the yaws disease was 13·5 years. The lesions responded specifically to neo-salvarsan.

Tertiary Stage.—In the primary and secondary stages there is littl difficulty in distinguishing between syphilis and yaws, but at the tertiary stages there are some cases in which diagnosis is impossible; the lesions in such are periostitis of the long bones, spindle-shaped swellings of the fingers, gangosa. Other manifestations of uncertain origin were arthritic enlargement, extensive skin ulcerations and great enlargement and deformity of the hands, legs and feet. There were 79 persons in the "Gomma" group, 67 of whom presented no other lesion; the average duration of these cases was 16·3 years, but in 10 cases the disease had existed only two years or less. [The authors do not say whether natives suffering from undoubted syphilis were seen.]

Latent Yaws.—The authors include in this series 127 persons who had no active lesions and in most instances had scars, doubting whether spontaneous cure occurs in any considerable proportion. In 33 of them the primary lesion had developed within two years of their application for treatment, so that the majority were probably in a latent period following the early secondary eruption. They were therefore fit subjects for treatment.

General Remarks.—The Wassermann test was made in 91 cases and found strongly positive in 78. The negative reactions occurred in the late secondary, the tertiary, and the latent stages. In discussing the sequence and duration of the various stages the authors draw attention to the overlapping, *e.g.*, in one case the madre buba was present with tertiary lesions. They have tabulated those cases which presented a single manifestation, arranging them according to the average age of each group.

Diagnosis.	No. of Cases.	Age.		Duration.	
		Average.	Extremes.	Average.	Extremes.
M. ..	15	6·6 yrs.	9/12–12 yrs.	2·3 mos.	1/12–7/12 yrs.
B′. ..	82	8·8 ,,	1½–50 ,,	12·3 ,,	1/12–7 ,,
B. ..	60	9·3 ,,	1–42 ,,	29·6 ,,	4/12–17 ,,
C. ..	327	21·6 ,,	3–68 ,,	9 yrs.	4/12–58 ,,
H. ..	127	23·8 ,,	1–80 ,,	9·7 ,,	2/12–59 ,,
P. ..	5	25 ,,	15–45 ,,	14 ,,	10–19 ,,
SL. ..	37	28·8 ,,	5–80 ,,	13·5 ,,	5/12–39 ,,
G. ..	67	29·3 ,,	3–85 ,,	16·3 ,,	7/12–59 ,,
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They believe that this arrangement indicates the sequence in which the various lesions develop and it is to be observed that the average duration of the disease, with the exception of the studded lesions, follows the same orderly progression. The reader will note that the average age and average duration are calculated from the date of observation, so that the figures must be multiplied by some factor which the authors suggest should be 2.

Result of Treatment.—This section is interesting but less valuable than the rest, for the time the patients were under observation was limited and many after receiving a single treatment did not return. It suffices to say that the natives displayed the usual eagerness for injections. The earlier the stage of the disease the readier was the response to treatment.

A. G. B.

PIETER (H.). **A propos du pian dans la République Dominicaine.**—*Rev. Méd. et Hyg. Trop.* 1922. Nov.–Dec. Vol. 14. No. 6. pp. 230–235.

This article was written to supplement that of MOSS and BIGELOW, of whose work the author seems critical. Fever, he finds, is almost constant in the secondary stage; it is vesperal and more evident in the adult than in the child; it is influenced by quinine. He emphasizes the fact that yaws does not disappear of itself; the primary and secondary lesions may pass and the appearance is one of complete cure, but sooner or later come the tertiaries exposing the patient to lamentable ulcerations and deformities. He has had many patients who have relapsed 2–4 months after a total of 4·5 gm. of novarsenobenzol, and even after a second course. The popular

treatment in the Republic consists of van Swieten's liquor or *agua divina* (a solution of mercuric chloride in 100 parts of alcohol and 900 of water). The patient is isolated, kept on a strict diet, and deprived of salted food. After 40–60 days he recovers and has no relapse or recurrence, or he may take the *agua divina* for a two-month period in three or four successive years. The same result is attained more quickly by mercurial injections. Pot. iod. is useful, but not indispensable. In the Dominican Republic babies are often inoculated on the third or fourth day at the umbilical wound ; the result is either lethal tetanus, or other infection, or a mild attack of yaws. The author states that in an infant whose mother is in the secondary stage of yaws such an inoculation is abortive. It should be added that the paper is quite undocumented.

A. G. B.

GUTIERREZ (Perpetuo D.). **Yaws : Its Manifestations and Treatment by Neo-Arsphenamin.**—*Arch. Dermat. & Syph.* 1922. Sept. Vol. 6. No. 3. pp. 265–287. With 21 figs.

A well illustrated paper describing the results of an investigation of yaws in a village on the shore of Manila Bay, where it is endemic in the poorer class. The figures are misleading unless it is remembered that with few exceptions only cases in the "infectious" stage were seen. It is the author's impression [certainly erroneous] that inhabitants of towns bordering on salt water harbour the disease, while inhabitants of interior towns are free. The great majority of the 257 cases in the earlier stages were children, 226, or 88 per cent. ; in many cases the disease seemed to have originated in a scabies lesion.

Of the primary lesion it need only be noted that in six cases where it was present all signs of the secondary lesions had disappeared ; these lesions required a second injection of neo-arsphenamine.

Besides the papules and nodules of the secondary stage the author describes macular lesions and "ichthyosis-like shins," which formed 3 and 2 per cent. of the secondary eruptions.

These macular eruptions are "a primary and distinct type of secondary eruption, similar to the macular eruptions of the secondary stage of syphilis. They are discrete, macular, lighter in color than the surrounding skin, and vary in size from that of the head of a match to that of a lima bean or larger. They are covered by fine furfuraceous white scales. These scales are easily detached and when a case is seen in the clinic only a few of the lesions are present on the surface. Around the follicles, however, they are closely packed, giving the appearance of a follicular lesion. Two or more of these lesions may coalesce, forming bigger patches as shown in Figure 13. These lesions remain for weeks as such, finally disappearing and leaving a white patch of skin."

The histopathology, which is described, is not dissimilar to that of frambesiform lesions.

"Closely related to this type of eruption is an eruption which we have termed, for want of a better name, ichthyosis-like shins. This is a diffuse mild keratosis not dissimilar to the skin found in persons suffering from xerodermia. The whole anterior portion of the tibia is affected, being covered with firm branny scales, white or grayish white (Fig. 16). The scales are more adherent than the scales found in the preceding type of eruption. Scattered over the surface at times are small papules. This type of eruption is not common, being found only three times in 196 cases, or in 1·53 per cent. of cases. It may be found in association with the macular, papular or nodular eruptions. We have observed it only in children."

TABLE 3.—The Relation between the Appearance of the Primary, Secondary and Tertiary Lesions.

	No. of Cases.	Percentages
Primary	10	4·63
Secondary	90	39·30
Tertiary	24	10·48
Combined Lesions :		
Primary, secondary	52	22·70
Secondary, tertiary..	39	17·03
Primary, secondary, tertiary	14	6·11
Total Cases	229	

Of tertiary lesions, bone lesions, gummas, and plantar lesions or clavus are briefly described.

Of 275 cases treated with neo-arsphenamine, 0·6 gm. or less, 94·5 per cent. were well one and a half months after the last injection. In 86 cases two injections were given, in the remainder one. Ulcers and primary lesions did not improve as was expected, and tertiary lesions required more than a single injection.

A. G. B.

CLAPIER. **L'endémie pianique sur le Bas-Oubangui. Essai de lutte antipianique, 1920.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1921. July–Aug.–Sept. Vol. 19. No. 3. pp. 319–334. With 1 map.

This study of yaws is based on the examination of 45,000 persons in the basins of the Middle Congo and the middle and lower Oubangui rivers ; over 2,000 cases were seen, many more than once. Generally speaking, the disease is the more common the further the villages are removed from these rivers or their tributaries. Children in the forest villages are often attacked in a proportion of 20 per cent. and for every adult who suffers there are nine children. In some localities the natives consider the eruption of yaws in the younger generation as natural as the eruption of teeth.

The author gives no detailed account of symptoms, but refers to some which are rarely mentioned. When the yaws lesions are generalized, in three-quarters of the cases lesions of the perineum or feet cripple the patients for months. About half the cases at the same time suffer a loss of flesh which may persist after natural recovery and may be regarded as a stigma of the disease ; sometimes it is so extreme as to merit the word cachexia. Such patients suggest the last stage of sleeping sickness and the author has at times examined the blood with this disease in mind. Anaemia is another symptom illustrated by the table.

Haemoglobin per cent.	Trypanosome-free children suffering from yaws before treatment.	Children free from both yaws and trypanosomes.
20	2	0
30	3	0
40	1	0
50	20	3
60	53	49
70	27	46
80	0	11

In the yaws patients in three-quarters of the cases the co-efficient of haemoglobin is 60 per cent. or less, whereas in more than half the others it is 70 per cent. and more. The anaemia observed in all is in part due to intestinal parasites and malaria.

Hypertrophic osteitis and goundou is the fourth symptom discussed and here he refers to his previous paper [see this *Bulletin*, Vol. 16, p. 468]. With fresh experience he is confirmed in his opinion that osteitis is part of the yaws syndrome. He has seen hypertrophic osteitis, with or without goundou, accompanying yaws in infants at the breast, in adolescents, and in adults, and notes that the natives associate the two conditions. Details of three cases are given. The author is so convinced that goundou is of the same nature as the hypertrophic osteitis which affects bones elsewhere that he speaks of goundou of the lower limbs and the elbows. As sequels of yaws he mentions ulcers, adherent cicatrices, and mutilations, the latter chiefly of the toes.

He discusses the association with yaws of malaria, helminth infections, and sleeping sickness; in the last instance the mortality is increased. The author thinks that wasted yaws children fare badly when attacked by enteritis or pneumonia. Indirectly the mortality occasioned by yaws is considerable.

Juxta-articular nodosities are next discussed. The author found in one area 29 cases among 500 persons examined and tabulates the body regions affected. All said they had had yaws and no signs of syphilis were detected, but the author cautiously refrains from drawing a conclusion.

Having a good supply of novarsenobenzol, he treated 1,200 cases. Using 1–1·5 cgm. per kilo body weight intravenously he cured 25 per cent. with a single injection, and 50 per cent. with two. He believes that an anti-yaws campaign in French Congo is possible and not difficult of execution, and suggests that it be combined with the campaign against sleeping sickness. Natives are drawn, he affirms, by arsenobenzol as bees by honey. He would give three injections to each patient and apply an antiseptic paste to the lesions.

A. G. B.

VAN DEN BRANDEN & VAN HOOF. **Contribution à l'étude de l'infection pianique chez les indigènes du Congo Belge.**—*Ann. Soc. Belge de Méd. Trop.* Brussels. 1922. Vol. 2. No. 1. pp. 43–82.

This long paper deals with (1) the therapeutic activity of sulfarsenol in yaws, and (2) the Bordet-Wassermann reaction in that disease.

1. Sulfarsenol is described as the sodium salt of "l'ether sulfureux acide du monométhylolaminoarsénophénol." Notes are given of many cases to illustrate the rate of disappearance of treponemata from the lesions, the period at which the Bordet-Wassermann reaction becomes negative, the duration of the sterilization and of the absence of the Bordet-Wassermann reaction, and to compare sulfarsenol with other organic arsenicals. The general conclusions are that its therapeutic action equals that of neosalvarsan and novarsenobenzol. All, while they readily cure recent cases, affect chronic cases but slowly. The low toxicity of sulfarsenol and the ease with which it is given intramuscularly or subcutaneously renders it of special value in young subjects, fat females, and cachectics in whom intravenous injection presents difficulties.

2. The technique adopted was that of CALMETTE and MASSOL, which has the advantage of avoiding sources of error introduced by malaria. They studied 110 cases, and obtained the results shown below :—

B.-W.	Primary.	Secondary.	Tertiary.
Strongly Positive	7	38	27
Moderately Positive	0	3	3
Slightly Positive	1	1	1
Very Slightly Positive	2	2	5
Negative	1	5	1
Doubtful	0	1	0
No Haemolysis	0	6	2
Total	11	56	39

They conclude that the Bordet-Wassermann reaction in yaws is positive in about the same proportion of cases as in syphilis, that it is activated in recent cases and reactivated in latent cases under the influence of even minimal treatment, and that its negativation may be difficult to obtain.

The cases on which these figures are based were not grave ones; there was no destruction of tissue or bone, such as one sees in gangosa. The disappearance of the lesions does not signify cure, and in one case where the dose was small and a relapse occurred the disease had become resistant to treatment. The B.-W. reaction indicates whether a cure has or has not been effected. Treatment must be continued till the sero-reaction is negative, and if it does not remain negative the test must be repeated at shorter or longer intervals.

A. G. B.

FOX (Howard) & OCHS (B. F.). **Frambesiform Syphilis (?).**—*Arch. Dermat. & Syph.* 1922. Mar. Vol. 5. No. 3. p. 411.

FOX (Howard). **The Prevalence of Yaws (Frambesia tropica) in the United States.**—*Ibid.* Dec. Vol. 6. No. 6. pp. 657–674. With 4 text figs.

The case is recorded of a full-blooded negress who left Montserrat in July for New York and developed an itching "pimple" on the thigh in November. At the same time she suffered from headache, pain in shoulder and chest, and sore throat, and a week later other lesions appeared. When seen she had 30 lesions in various parts of the body, dry and scaly or covered with dirty yellowish crusts. The removal of the crusts left a raspberry-like surface. Spirochaetes were found and the Wassermann was 4 +. Inoculations were made into the testes of four rabbits. A mild reaction was accompanied by slight lymphadenitis, and "over the surface of the tunics there were a number of minute granulomatous nodules identical in all respects with tunic nodules" observed in a strain of yaws isolated by Dr. NICHOLS. A histological report is given on a piece of tissue excised from the chest and two figures; this also favoured the diagnosis yaws.

Dr. Fox discusses the occurrence of yaws in the United States from a reference by BRICKELL in 1737 onwards, but Dr. John LANE in the discussion refers to a letter written in 1687 from Virginia by Rev. John CLAYTON to Dr. Nehemiah GREW about a Distemper among the Indians called yaws "nearly related to the French-Pox."

The author notes that a report of the American Dermatological Association published in 1914, containing a tabulated list of 679,376 cases, included only 28 cases of yaws, all from the north and the majority from the large seaports, which strongly suggests importation. It is recognized as possible that cases in the south may be overlooked, but the author does not think that this is an adequate explanation. It is concluded that yaws is a rare disease in the United States in spite of its prevalence in the West Indies, that being a tropical disease it would not thrive in the northern states, and that even should it obtain a foothold in the southern states it could easily be eradicated.

In the discussion Dr. W. A. PUSEY could not understand why yaws is not found in the southern states, having regard to the close communication between gulf ports and the West Indies and the similar condition of the negroes in the Islands and the Gulf. He suggests that there is some factor other than "tropical climate" in its propagation. Dr. SCHAMBERG pointed out the similarity of the pictures in this case to those of his own [this *Bulletin*, Vol. 18, p. 252]. In the diagnosis between syphilis and yaws, apart from the swarms of spirochaetes found in yaws and the difficulty of staining them, there is the difficulty of maintaining the yaws infection in rabbits. The syphilis organism can be more easily perpetuated thus. He urges that in cases supposedly cured by arsenicals the Wassermann reaction be followed up.

A. G. B.

PARHAM (J. C.). **The Relation between Syphilis and Yaws as observed in American Samoa.**—*Amer. Jl. Trop. Med.* Baltimore. 1922. July. Vol. 2. No. 4. pp. 341–349. (Discussion 349–352.)

The author, a naval surgeon who has spent 2½ years in American Samoa, regards yaws as "stone age syphilis." Though Samoa was visited by Dutch ships in 1722, and afterwards by French, British, and U.S. ships, missions were established in 1830, and since 1850 commercial intercourse with two of these nations and with Germany has been active, syphilis is not found. The author, as health officer in American Samoa, visited every incoming vessel carrying natives and examined all for gonorrhoea, a quarantinable disease; he attended the native hospital for 2½ years; he examined 3,226 natives in Tutuila for yaws and checked their numbers with the census; but he never discovered any venereal disease. He concludes that the Samoan is not capable of infection by the *Treponema pallidum*. Similarly the Fijian is immune from syphilis, whereas both these peoples are affected in childhood to 100 per cent. with yaws. He refers to the published instances of yaws and syphilis in the same individual with incredulity, discounting CHARLOUIS' well-known experiment, and not referring to animal experiments, such as those of NEISSER and HALBERSTÄDTER (1907–8). He refers to the alleged differences in strains of syphilis, considers with HARPER that tabes and general paresis may result from yaws, and quotes BUTLER to the effect that yaws may be hereditary. In these ways he would bring it into line with syphilis, and he attributes its comparative mildness to the change in method of transmissal. "The lack of ancestral treatment combined with the difference in personal habits explains the clinical (framboesial) habitus of syphilis in these natives."

BUTLER, who discusses the paper, agrees with the author, and suggests that "under stone-age conditions of sanitation syphilis constitutes one of the exanthemata of childhood."

[Though the author does not definitely say so, he implies that gonorrhoea is a rare disease in Samoa. This would weaken the argument.]

A. G. B.

i. CHATELLIER (L.). **Sur un cas de pian avec altérations du liquide céphalo-rachidien et glycosurie.**—*Bull. Soc. française Dermat. & Syph.* 1921. Vol. 28. pp. 208–210.

ii. BORY (Louis). **Un cas de pian.**—*Ibid.* pp. 459–462. With 2 text figs.

i. A man who had lived 25 years in French Guiana had a generalized yaws eruption in February, 1920. This yielded to novarsenobenzol, but recurred in May, and in spite of a second course of arsenobenzol, again in November. He was admitted to hospital in January, 1921, when he had a typical crusted yaws eruption on face, hand, arm and back. From a large papule serum was expressed which contained spirochaetes in abundance. The urine contained glucose, 12 gm. per litre, no albumen. The W.R. was strongly positive. The cerebrospinal fluid contained 10 lymphocytes per cmm., and gave a very strongly positive W.R. After five injections of novarsenobenzol the lesions vanished and the sugar in the urine fell to 4 gm. per litre. No other treatment had been given. From these findings the author concludes that the yaws spirochaete can cause lesions of the viscera.

ii. The patient, a Soudanese soldier in France, had three varieties of lesions: framboesiform chiefly on the face, syphilitiform plaques in the ano-genital region, scattered pityriasis-like spots. The lymphatic glands were generally enlarged and hard. The W.R. was strongly positive. Fine treponemata were seen, indistinguishable from Schaudinn's parasite. The lesions rapidly yielded to large mercurial injections. The author comments on the close relation between yaws and syphilis.

A. G. B.

COPPIN (H.). **Zona intercostal chez un planique [pianique] traité par le sulfarsenol.**—*Bull. Soc. Med.-Chirurg. Indochine.* 1921. Dec. Vol. 12. No. 2. pp. 150–152.

A child, aged six, entered hospital for yaws of three months' duration. The lesions are described at length. After three injections of sulpharsenol and a month after admission an eruption of herpes zoster appeared at the ninth rib. There was no pain, but this is believed to be the rule in the child. The author suggests that the attack of shingles was a complication of yaws, but admits the possibility that it was due to the arsenical.

A. G. B.

i. TOURNIER (E.). **Le traitement du pian par les injections sous-cutanées de Novarsénobenzol.**—*Ann. de Méd. et Pharm. Colon.* Paris. 1922. Jan.–Feb.–Mar.–Apr. Vol. 20. No. 1. pp. 37–39.

ii. ——. **Le traitement du pian par les injections sous-cutanées de Novarsénobenzol.**—*Bull. Soc. Path. Exot.* 1922. June 14. Vol. 15. No. 6. pp. 489–491.

i. Yaws is very common in Togo, and is one of the chief factors of infantile morbidity. In native children intravenous injection presents difficulties, so that the author turned to hypodermic medication. In rapidity of action and efficacy the two methods were comparable, the

characteristic yaws eruption disappearing after a second injection in the majority of cases. The tertiary lesion, hypertrophic osteitis, if it is really to be attributed to yaws, was more resistant. Novarsenobenzol is to be preferred to other arsenicals; galyl can be given only intravenously, metarsenobenzol occasioned abscesses, sulfarsenol was painful and often caused induration. The arsenobenzol, in concentrated solution in serum, is injected behind the shoulder into the cellular tissue near the external margin of the scapula. In 19 instances out of 287 a swelling formed which disappeared in a week; abscess was never seen. Doses of 15, 30, 45 and 60 cgm. are dissolved in 2–4 cc. of serum. He usually begins with 30 cgm., giving 45 at the second injection six days later; 18 per cent. of cures were obtained after the first injection, and 60 per cent. after the second; 22 per cent. required further treatment, which took the form of Gibert's syrup (biniodide of mercury). The advantages claimed for this method are its simplicity and harmlessness; it can be used with safety by a hospital assistant. It has the further merit that the patient need not be fasting, a state which it is not easy to secure in young children.

ii. This is a briefer account of the same series of injections, but the arsenical is here stated to have been dissolved in sterilized salt solution, 4 in 1,000. In the discussion VINCENT advised the treatment of children with yaws by enemata of "914."

A. G. B.

BEURNIER & CLAPIER. **Traitement du pian par le 189 administré par la voie buccale.**—*Bull. Soc. Path. Exot.* 1922. July 12. Vol. 15. No. 7. pp. 528–533.

The authors give short notes of 16 cases of yaws treated by the mouth with "189" with success, 5 cases in which the efficacy was less, and in 4 of which resort was had later to injections, and 2 in which diarrhoea set in, the drug was withheld, but death followed. They first used it at 48-hour intervals, later, owing to toxic symptoms, at 72 hours. Such symptoms are grave disturbances of vision and diarrhoea with albuminuria. Diarrhoea may not be detected promptly in negroes owing to the satisfaction bred in them by easy evacuations. The authors consider the drug a valuable one in yaws if the following directions be followed:—For injections do not exceed the dose of 1·5 cgm. per kilo, and in any event do not pass 1 gm. Repeat the injections at 48-hour intervals till the third or fourth time, then every three days till the sixth or seventh. The drug is more active in subcutaneous injection than by the mouth and is better tolerated; injections, therefore, are to be preferred for hospital use, but the oral method could be practised in the bush by the natives themselves on the first manifestation of yaws.

A. G. B.

BEURNIER & CLAPIER. **Premiers essais du 189 au Gabon. (Pian, Syphilis, Ulcères phagédéniques.)**—*Bull. Soc. Path. Exot.* 1922. July 12. Vol. 15. No. 7. pp. 607–613.

Yaws.—Every other day an intramuscular injection of a freshly sterilized and cooled 10 per cent. solution of "189" was given, 1 gm. to adults, 0·3–0·75 to children. A more concentrated solution caused abscess. Notes are furnished of 15 cases, all of which recovered.

Other patients ceased to attend, and were probably cured, or at least improved. The conclusion is reached that an average of 4 to 6 injections of "189" at 48-hour intervals cures acute generalized yaws. This treatment and that by novarsenobenzol are compared, and the authors seem to prefer "189."

Tertiary Syphilis.—Two patients with extensive ulceration, which may have been syphilitic, were treated with success. The authors comment on the abuse of this diagnosis in the tropics.

Phagedenic Sores.—The ulcer is curetted and thermo-cauterized. Gauze soaked in a 10 per cent. solution of "189" is packed in and secured by wool and a bandage. An injection of 1 gm. is given, and every other day the wound is dressed and the same solution applied. Of 23 cases 20 began to improve after the second dressing and injection and the phagedenic process ceased, but in 15 instances other treatment was necessary to effect cure. A case is mentioned in which the use of 16 gm. in 21 days was followed by profuse diarrhoea and loss of vision.

A. G. B.

AUDEN (F. T.). **Antimony in Yaws.** [Correspondence.]—*Brit. Med. Jl.* 1922. July 15. p. 83.

As a result of the perusal of Dr. CAWSTON's description of the treatment of syphilis by antimony at Durban, the author, among whose duties it is to treat some 7–8000 natives for yaws in British East Africa, gave a few acute cases intravenously 1 gr. of tartar emetic daily for 8–10 days. No improvement was noted, and the patients, accustomed to see their fellows cured in three days by galyl or arsenobillon, became restive and demanded their discharge.

A. G. B.

VAN DEN BRANDEN. **Sels de bismuth dans le trypanosome humaine et le pian. Cacodyline dans la trypanose humaine.**—*Bruxelles Méd.* 1922. Aug. 20. 2nd Year. No. 20. pp. 507–508.

"Bi 36," a bismuth preparation of Belgian manufacture, was given intramuscularly dissolved in water in three cases of yaws. The lesions rapidly dried up and disappeared. The injections were well tolerated. The effect on the serological reaction remains to be tested.

A. G. B.

VISWALINGAM (A.). **Yaws in Malaya. Its Treatment and Prophylaxis.**—*Indian Med. Gaz.* 1922. May. Vol. 57. No. 5. pp. 172–175.

A general account of yaws, from which 25 per cent. of the Malays in Kuala Kangsar and Upper Perak are said to suffer.

A. G. B.

TUBERCULOSIS IN THE TROPICS.

CALMETTE (A.). **Les modes de diffusion de la tuberculose à travers le monde.**—*Rev. d'Hyg. et de Police Sanitaire.* 1921. Aug. Vol. 43. No. 8. pp. 654–662.

This important paper, delivered as an address to the Congress of the International Union against Tuberculosis in London on July 27, 1921, begins by a discussion on the frequency of tuberculosis amongst civilized peoples and its rarity amongst savage and nomadic races. For the determination of the degree of diffusion of infection in any given community, stress is laid upon the value of the Von Pirquet test, which the author, with characteristic sincerity, declares to be the best for the purpose, making no mention of his own excellent ophthalmic reaction which, though, in our opinion, less generally applicable than the cutaneous test, has, nevertheless, been of great utility in mapping out the distribution of the disease. The researches of METCHNIKOFF, ZIEMANN, Otto PEIPER, and others, are quoted to show how small is the percentage of positive results of tuberculin tests amongst communities living in relative isolation, and, in contrast to this fact, the high proportion of positive results in the large cities of Western Europe and America is noted as a proof that almost every individual in these cities must, sooner or later, become infected to some extent with the tubercle bacillus. Turning to the mode of diffusion of infection, Calmette while admitting that the heavily infected phthisic is the most dangerous source of infection, calls attention to the clear evidence, afforded by the observations of SCHROEDER and COTTON in America, and his own work in collaboration with GUÈRIN in France, that large numbers of individuals, apparently healthy, are able to act as "intermittent carriers" owing to the existence of lesions either occult or only to be inferred from the fact of a positive tuberculin test. He quotes some of his own experiments proving that tubercle bacilli are frequently eliminated in the bile after intravenous inoculation in experimental animals, and he is of opinion that the intestinal route is a more important factor in the diffusion of infection than is generally believed. Laying stress on the fact that even small doses of infective material may, especially if frequently repeated, suffice to produce disease in susceptible persons such as children, negroes and others who are virgin soil to the germ, he points to the potential danger of apparently healthy "intermittent carriers" when they happen to be engaged in work, such as that of the explorer, the sailor or the merchant, which brings them into contact with the inhabitants of isolated parts of the earth's surface. The paper is a most suggestive and valuable one, though we are inclined to think that the danger of the intermittent carrier is not very great except to the infants and young children brought in close contact with him under *home* conditions.

S. L. Cummins.

LEGENDRE (Jean). **La Tuberculose dans nos Colonies.**—*Bull. Soc. Path. Exot.* 1922. Jan. Vol. 15. No. 1. pp. 51–52.

Legendre writes briefly to call attention to the danger to which the natives of certain of the French colonies are exposed by the return of ex-soldiers of native races infected with tuberculosis during service in France or in the occupied territories. He points out that the 1,662 infected persons repatriated to West Africa, Madagascar, Indo-China and the Pacific since the end of hostilities up to June, 1921, are capable of becoming foci of an infection almost certain to spread widely in countries where hygiene does not exist and where the inhabitants are notoriously susceptible to tuberculosis. As the author puts it: "Nous aurons ainsi introduit et acclimaté dans nos deux grandes possessions, déjà si éprouvées par des affections épidémiques et endémiques, une maladie meurtrière de plus." It would seem that it is not only in the British Empire that the responsibility of a dominant nation for the natives of its dependencies is forgotten or ignored.

S. L. C.

McDONALD (W. M.). **Pulmonary Tuberculosis as a Problem of Tropical Medicine.**—*Jl. Trop. Med. & Hyg.* 1922. Mar. 15. Vol. 25. No. 6. pp. 69–71.

In this paper, the author makes the excellent point that the subject of tuberculosis is too much ignored in the instruction of physicians for practise in the tropics. This is only too true and the paradox is frequently met with of the young doctor, well trained to deal with sleeping sickness, kala azar, beriberi and many other interesting diseases, at last face to face with the *real* problem of some tropical settlement which proves to be none other than tuberculosis after all, the study of which he has somewhat neglected. The most valuable passages in the paper are those dealing with the differential diagnosis of tuberculosis and malaria. "We must bear in mind that it is just when we feel sure that the case is obviously malaria that we are most likely to omit investigation for possible pulmonary tuberculosis." Less sound are the paragraphs in which fresh air and exercise are dealt with. "The onset of pulmonary tuberculosis is like the lighting of a fire. The fire once lit, exertion is the fan which spreads the flame; rest is the water which quenches it." This is just the sort of half truth that is apt to mislead. The phrase is probably quite accurate so far as concerns the tuberculosis of patients of African stock but it is inapplicable to many of those met with under conditions of Western civilization, in whom controlled auto-inoculation through graduated exercise is by far the most hopeful treatment.

S. L. C.

POWELL (Arthur). **Some Observations on Tuberculosis in India.**—*Proc. Roy. Soc. Med.* (Sect. of Trop. Dis. & Parasit.). 1922. Sept. Vol. 15. No. 11. pp. 56–62.

Such a paper as that now under consideration, dealing authoritatively with tuberculosis as seen in India, has been long awaited by students of the disease. We know the conditions in Africa, thanks to the many excellent observations of French scientists inspired by the suggestions of CALMETTE, and to the sound work of ZIEMANN and others in German Colonies. The observations of METCHNIKOFF, BURNET and TARRASSEVITCH have informed us on the phenomena of the disease in the steppes

of the Kalmuck Tartars. SCOTT has familiarized us with the conditions obtaining in Hong Kong; and BUSHNELL has recorded the manifestations of tuberculosis amongst American Indians and negroes. There are many fairly good articles about tuberculosis in India and a recent book by LANKESTER adds considerably to our knowledge; but Dr. Powell's paper is far the most important contribution to the subject that we have yet met with. His knowledge is derived from many years of service and observation as Medical Officer to the Bombay City Police, a force ranging in strength from 2,300 to 3,000 men and recruited to a great extent from country districts. Amongst these men, tuberculosis is exceedingly common and of a progressive and fatal type. Of 1,532 recruits tested by the Von Pirquet reaction between 1912 and 1918, only 87 or 5·67 per cent. were found to be "positive." Amongst 12,000 young men, mostly recruits, newly arrived from the country, and carefully examined, special attention being paid to the lungs, the number found to be suffering from pulmonary disease was extremely small. Whereas in Europe about 85 per cent. of bodies are found at autopsy to show signs of old tuberculous infection, the proportion of cadavers found by Powell to contain such lesions was, in over 8,000 post-mortems on Indians, only 2·3 per cent. "Fibroid phthisis was rarely seen." It is clear, therefore, that these people have had none of the minor infections that lead, in Europe, to the acquisition of resistance. Under these circumstances it is usual to find that the clinical manifestations of the disease are acute and severe. In India, too, this rule is found to hold good. "Tuberculosis in the Indian is much more acute, and more rapid, than in the European: recovery is the exception. I think we can safely say that the great majority of Indian patients die within a year of their first symptoms." The headings of the paragraphs of Dr. Powell's paper serve, in themselves, to give a vivid idea of the facts:—

"The first symptom of tuberculosis in a majority of Indians is fever—not cough. . . .

"The first physical sign in Indians is often a deposit at the hilum of the lung when fever is the only symptom present. . . .

"'Low Fever' is often incipient tuberculosis. . . .

"Haemoptysis is relatively uncommon among Indians. . . .

"In adult Indians acute tubercular broncho-pneumonitis is very frequent, though in Europe it mostly occurs in children. . . .

"Many apparently typical cases of lobar pneumonia in Indians are tubercular. . . .

"Bovine tuberculosis is practically non-existent in Bombay."

This last observation is worth noting. It is so frequently the case that an absence or rarity of bovine tuberculosis coexists with a very acute type of disease in man that it is difficult to avoid the conclusion that the two phenomena are related. The author is mindful of this possibility. He says, "the absence of bovine tubercle may be a factor in the acuteness of human tuberculosis in India."

The picture that he draws of sanitation in Bombay will be recognized as correct by all those who have helped to shoulder this part of "the White Man's Burden" in the East.

It is to be hoped that some of our tuberculosis experts so familiar with the disease as seen in England and so blind to its manifestations elsewhere, may peruse what is one of the most instructive papers that have appeared about tuberculosis in recent years.

S. L. C.

CURASSON. **Relations entre la tuberculose humaine et la tuberculose porcine à Dakar.**—*Bull. Soc. Méd.-Chirurg. française de l'Ouest-Africain.* 1919. Nov. Vol. 1. No. 4. pp. 7–12.

This short paper by Veterinary Surgeon Curasson is of real value since it approaches the question of tropical tuberculosis from a point of view that has received too little attention.

After referring to the extreme rarity of bovine tuberculosis in West Africa, he make a notable exception of a race of cattle known as Lagunes in Dahomey, amongst which there appears to be a tuberculosis morbidity of about 33 per cent. This exceptional race of cattle would appear to merit the closest study as to the exact nature of their infection, the type of tubercle bacillus concerned, and how the infection first arose ; and it is to be hoped that further information will be forthcoming in the future.

M. Curasson now passes on to describe five instances observed by him at Dakar of tuberculous infection of the retropharyngeal lymphatic glands in pigs. Careful post-mortem examination and the inoculation of the caseous material into guinea-pigs rendered it possible to make a definite diagnosis of tuberculosis. The mode of infection was probably through the ingestion of contaminated material over an area covered with ordure close to the municipal dump, where pigs are turned out to feed by their native owners. The fact that the disease had started in the retropharyngeal glands supports this theory since it points to infection by the alimentary tract.

The danger of porcine infection is considerable for man, since sausage makers use uncooked material. In the discussion M. HECKENROTH pointed out that the danger would chiefly affect Europeans as the native population does not eat sausages. He made some instructive remarks as to the distribution of human tuberculosis in French West Africa and attributed the marked susceptibility of the native of the inland districts to the " absence of all chance of the relatively immunizing previous contact " with the germ. The inhabitants of Dakar, an urban area, however, tend to exhibit the ulcero-caseous form of pulmonary tuberculosis which, in them, takes the relatively benign form commonly met with in Europe.

S. L. C.

NOC & HUCHARD. **La tuberculose à Dakar.**—*Bull. Soc. Méd.-Chirurg. française de l'Ouest-Africain.* 1920. June. Vol. 2. No. 6. pp. 168–170.

The authors call attention to the paper by BORREL in the *Annales de l'Institut Pasteur* on March, 1920 [this *Bulletin*, Vol. 16, p. 190], and note the distinction drawn by him between the rarity of tuberculosis in the districts and villages of the interior of Senegal and its relative frequency in the towns where there is closer contact between the natives and Europeans. They cite three cases that have recently come to their knowledge at Dakar in all of which the clinical picture was that of tuberculosis ; but it is to be noted that in not one of the three was the diagnosis made absolute by the demonstration of tubercle bacilli in the sputum. Of more critical importance is the fact, recorded by the authors, that out of 120 sputa examined at the Bacteriological Laboratory of French West Africa 25 samples were found to contain Koch's bacillus. M. BEAUJEAN, in the discussion which followed,

cited a case seen by him at Dakar with "positive" sputum. He criticized the rather loose application, by BORREL and others, of the name "Senegal" to all the French West African Colonies taken as a whole.

S. L. C.

CURASSON (M.). **La tuberculose animale en A. O. F.; ses rapports avec la tuberculose humaine.**—*Bull. Soc. Méd.-Chirurg. française de l'Ouest-Africain.* 1920. July. Vol. 2. No. 7. pp. 188–190.

Following his note on tuberculous lesions of human bacillary type found in Dakar, Curasson gives further particulars of the curious endemicity of tuberculosis amongst the lagune race of cattle of Bas-Dahomey [see this *Bulletin*, page 186] to which the author had referred in his previous paper. It would seem that the striking frequency of tuberculous lesions, often generalized, amongst these cattle led PIERRE and PECAUD to verify the nature of the disease by bacteriological investigation, these workers proving the condition to be definitely tuberculous. It is clear that the question of race does not enter into consideration, as other strains of cattle of African origin brought into contact with the lagune beasts are easily infected. The conditions of stalling of these latter are extremely bad and calculated to facilitate the spread of infection once introduced. Fortunately there is a zone of territory in which domestic animals do not live which separates these infected cattle from other cattle regions and the endemic is thus very strictly confined in extent. This limited zone presents a marked contrast to the rest of West Africa, where tuberculous infection has been up to the present almost unknown. Quite recently, however, COPPEY at Bamako and the author at Dakar, have met with tuberculosis of the udder in native cattle, the bacilli being of human type. In one of the cases noted by Curasson, the cow was from a farm where a brother of the proprietor had recently died from tuberculosis. No mention of the bacillary type prevalent amongst the lagunes is made, but information on this point would be of the greatest interest. The reviewer in 1902 failed to discover a single case of tuberculosis amongst many cattle coming under his notice in the Bahr-el-Ghazal in the Anglo-Egyptian Sudan, and it seems that this has been the almost universal experience of those who have given attention to the point in the non-Europeanized districts of Africa. These notes of M. Curasson are of the highest interest and importance.

S. L. C.

TEPPAZ (L.). **La tuberculose bovine à l'abattoir de Dakar.**—*Bull. Soc. Path. Exot.* 1922. May 10. Vol. 15. No. 5. pp. 356–357.

Teppaz brings to notice a case of tuberculosis in a zebu at the slaughter house of Dakar, the first instance of bovine infection seen by him in the thousands of cattle that he has examined both at Dakar and Saint Louis. The infection was slight and such as might have disappeared spontaneously, and the animal was in excellent condition. The pus from an incised "tubercle" was found microscopically to contain tubercle bacilli in very small numbers. On inoculation into a guinea-pig, the animal became infected and the bacilli were found in large numbers at the site of inoculation. It is clear, therefore,

that the zebu is not refractory to infection with tuberculosis. Inoculation of a rabbit has been carried out to verify the nature of the strain, but it seems probable that it was of human origin, since the disease is practically non-existent in cattle but increasingly common amongst men in Senegal.

S. L. C.

LEGER (Marcel) & HUCHARD (G.). **Contribution à l'étude de la Tuberculose au Sénégal : cuti-réaction chez les enfants de Dakar.**—*Bull. Soc. Path. Exot.* 1922. May 10. Vol. 15. No. 5. pp. 344–348.

L'extension de la tuberculose au Sénégal s'impose à l'attention des practiciens." It is the same story everywhere throughout those colonial possessions from which levies of natives were brought to Europe during the Great War or where the spread of western culture has thrown the natives and their European masters into close juxtaposition. Leger and Huchard, in the paper under review, record their investigations as to the proportion of native school children reacting to the Von Pirquet tuberculin test, and they find it to be high: no less than 38 per cent. for children from 7 to 10 years old and 49 for those between 10 and 15. It is recalled that, in 1911 and 1912, COMMELERAN found but 9 per cent. in subjects between 1 and 15 in Tivaoune and neighbouring Senegalese villages, FONQUERNIE 12 per cent. at Bakel, and CAZENEUVE and BAISEZ 11 per cent. in Casamance, while at Saint Louis the proportion was 27·5 per cent. "Dans les deux grandes villes du Sénégal, les autochtones ont reçu, en même temps que la civilisation apportée par les Français de la métropole, les tares maladives de ces derniers." The authors promise a further communication on the tracing of the tuberculin-positive children back to their homes. This will be awaited with interest.

S. L. C.

LEGER (Marcel) & PEZET (O.). **Quelques documents sur la cutiréaction à la tuberculine en Guinée française.**—*Bull. Soc. Path. Exot.* 1922. May 10. Vol. 15. No. 5. pp. 354–356.

The authors have investigated the distribution of latent tuberculous infection by means of the cuti-reaction in the Schools of Kindia and of Conakry in French Guinea, and find at the former place, 17·7 per cent. positive from 5 to 10 years, 28·3 per cent. positive from 10 to 15 years; while at the latter, the proportions are 20 per cent. and 37·5 per cent.

In 1911, WAGON found at Kindia only 12 per cent. of all ages to give a positive reaction, all except one of those reacting having been in contact with Europeans or Syrians. In the same year, BONNEAU found, amongst school children from 5 to 15 years old, at Conakry, only 3·5 per cent. of positives. It is therefore clear that the distribution of latent tuberculosis is much wider than it was 11 years ago. The authors are of opinion that a thorough anti-tuberculosis campaign is necessary both in French Guinea and in Senegal.

S. L. C.

HUDELLET. **Prophylaxie antituberculeuse en A.O.F.**—*Bull. Soc. Med.-Chirurg. française de l'Ouest-Africain.* 1921. June. Vol. 3. No. 16. pp. 103–107.

Hudellet cites two cases of Pott's disease in adults, one in a native of Portuguese Guinea resident in Dakar, the other in a native woman who had never quitted Dakar. He notes the decided increase of tuberculosis in Dakar since the war and the large number of returned soldiers of African race who have developed bony tuberculosis. He advocated the starting of a Tuberculosis Dispensary on the lines of the Calmette Dispensary in Paris.

The discussion, in which Drs. LE DANTEC, RIGOLLET and JOUENNE quote their experiences, brings to light several points of interest; that the conditions for the spread of tuberculosis are much more dangerous in the town-community of Dakar than in the villages of the interior; that the organization of dispensaries, while possible in Dakar itself, would be quite out of the question in the bush districts; and that the type of tuberculosis amongst returning Senegalese troops is so severe as to kill its victims very quickly and thus solve in some measure its own problems of infection.

S. L. C.

i. PARROT (L.) & FOLEY (H.). **L'étude de l'infection tuberculeuse en milieu indigène par la cuti-réaction à la tuberculine.**—*Arch. Insts. Pasteur de l'Afrique du Nord.* 1922. Mar. Vol. 2. No. 1. pp. 72–78. With 1 coloured plate.

ii. ——&——. **L'infection tuberculeuse chez les indigènes musulmans d'Algérie.**—*Ibid.* pp. 79–110. With 1 map.

i. The first of these two papers deals with the technique and the statistical methods employed in the investigations set forth in the second. The technique is a simple one, the cuti-reaction of VON PIRQUET being employed for the mapping out of the distribution of tuberculous infection throughout the French colonies in North Africa, and the method being standardized as far as possible in order to make the work of various observers comparable. The cuti-reaction is carried out by means of linear scarifications on the outer surface of the upper arm, upon the skin of the deltoid region. The tuberculin used is that supplied by the Pasteur Institute of Algiers; a "dry" control scarification is made close by, and operators are advised to make their incisions very superficial; "moins ça saigne, mieux ça vaut." So far as concerns the statistical records, these are of the simplest kind, consisting merely of comparative percentages of positive reactions according to race, locality, sex and "age group." It is laid down that a percentage has no value unless it is based on upwards of 50 observations, and that its value increases with the number of observations on which it is based.

In the opinion of the authors, the degree of tuberculous infection of a given region would seem to be known when, on the one hand, the percentage of reacting children from 1 to 15 years is ascertained, and on the other, that of adults, persons of 16 years and upwards. By the aid of these data, it is a simple matter to calculate the mean percentage for the area concerned, the "Index Tuberculinique Totale." It is found that, in infants of less than 1 year, the tuberculin reaction is almost universally negative, and it is therefore preferable to leave it out in estimating the percentage of positive reactions in children.

The following simple scheme is used for all records :—

COMMUNE OF

Region { Littoral. Table land. Saharian. } Population { Arab. Berber. Jewish. }

Positive Cuti-reactions.

Age.	Details. ♂	Details. ♀	Total ♂ and ♀	Total from 1 to 5 years.	Total from 6 to 15 years.	Total from 1 to 15 years.	Total Adults.
From 1 day to 1 year	0 in 15	0 in 24	0 in 36				
From 1 to 2 years	1 in 32	2 in 40	3 in 72	21 in 158 13·2 per cent.		78 in 302 25·8 per cent.	
From 3 to 5 years	10 in 40	8 in 46	18 in 86				
From 6 to 10 years	11 in 49	12 in 39	23 in 88		47 (*sic*) in 144 32·6 per cent.		
From 11 to 15 years	14 in 18	20 in 38	24 (*sic*) in 56				
From 16 to 30 years	12 in 17	14 in 20	26 in 37				80 in 109 73·4 per cent.
From 31 to 45 years	20 in 29	15 in 19	35 in 48				
From 46 and over	10 in 12	9 in 12	19 in 24				

From the totals .. { Children: 78 positive cuti-reactions in 302 subjects, giving 25·8 per cent. Adults: 80 positive cuti-reactions in 109 subjects, giving 73·4 per cent. }

$$\therefore \text{ the "index tuberculinique totale" is } \frac{25\cdot8 + 73\cdot4}{2} = 49\cdot6 \text{ per cent.}$$

ii. On the advice of A. Calmette, and following the lead given by Metchnikoff, Burnet and Tarassevitch (1911), in their investigations amongst the Kalmuk Tartars, a comprehensive survey of the distribution of tuberculous infection in North Africa was inaugurated by the Pasteur Institute of Algiers in 1911. The paper under review deals with more than 8,000 cuti-reactions carried out from the inception of the research to date. The Pasteur Institute of Algiers is to be congratulated on this opportune investigation, which, if it had been delayed, would have lost much of its value, owing to the rapid spread of European penetration into the regions concerned and the consequent increasing exposure of the natives to exogenous infection. The observations are grouped under the main headings of locality as follows :—(1) Littoral Tellien ; (2) Hauts-Plateaux ; and (3) Sahara. In each of these main groups, particulars of each racial type by age groups are given, together with a running commentary upon the local conditions, facilities for exogenous contact, tribal customs, housing, occupation and relative prosperity. To appreciate the paper as a whole, it must be read in the original, but much information is given

in the Recapitulation Table here reproduced. The main conclusions are as follows :—

1. Latent tuberculous infection is less widespread amongst the Mohammedan peoples of Algeria than amongst the people of Europe, but more so than amongst certain primitive groups in West and Equatorial Africa.

2. The infection attains its maximum of frequency along the coast, its minimum in the Sahara.

3. In the three main regions investigated, the degree of infection of the Mohammedan populations is a function of the following factors :—

(*a*) *Proximity of Europeans* : the degree of infection increasing with the proximity, the length of time and the numerical importance of the European penetration, as well as with all those geographic, economic and social factors that favour, increase or prolong the contact with Europeans.

(*b*) *Ethnic origin* : the " white " natives of both Arab and Berber stock showing more infection than the darker natives ; those using the Arabic language being, again, more infected than those using the Berber tongue.

(*c*) *Habitat* : nomadic tribes of tent dwellers and certain sedentary groups living in scattered huts showing, in all racial and other sections, less infection than the people living a sedentary life in village agglomerations.

4. Tuberculous infection attains its maximum in agglomerated and sedentary communities living in permanent contact with Europeans or brought into contact with them through temporary migration.

5. The investigation confirms and verifies the modern view as to the inter-dependence of socio-geographic isolation and a low degree of tuberculous infection in peoples of backward civilization.

These conclusions, of fundamental importance in the study of the epidemiology of tuberculosis, not only in Africa but as a problem affecting mankind in general, deserve to be widely read, especially by those who have had no opportunity of studying tuberculosis except in a European community and yet are charged with the framing of regulations and schemes for its control. The splendid example given by the Pasteur Institute of Algiers might well commend itself to those responsible for the Medical Services of our colonies, dominions and protectorates.

Cuti-reactions to Tuberculin in Mohammedan Natives of Algeria.*
Recapitulation Table of the Statistical Results.

	Locality.	Date of Enquiry.	From 1 day to 1 year.	From 1 year to 5 years.		From 6 to 15 years.		Total of 1 year to 15 years.		From 16 years and over (Adults).		Total, Children and Adults.†	Index total $\frac{A+B}{2}$
					Per-centage.		Per-centage.		Per-centage. (A.)		Per-centage. (B.)		
Littoral Tellien.	Alger	1911–16	1 in 51	10 in 50	20·0	34 in 65	52·3	44 in 115	38·2	5 in 7	71·4	49 in 122	54·8
	Ain-Bessen ..	1915	0 in 3	1 in 4	—	11 in 17	—	12 in 21	57·1	173 in 249	69·4	185 in 270	63·2
	Arba, bourg ..	1912	1 in 6	5 in 17	—	11 in 21	—	16 in 38	42·1	32 in 45	71·1	48 in 83	56·6
	,, banlieue..	1912	0 in 11	4 in 44	—	22 in 54	40·7	26 in 98	26·5	49 in 56	87·5	75 in 154	57·3
	,, (à 10 kilo)	1912	0 in 21	9 in 68	13·2	27 in 107	25·2	36 in 175	20·5	62 in 104	59·6	98 in 279	40·0
	Duzerville ..	1911–12	0 in 32	20 in 112	17·8	40 in 116	34·4	60 in 228	26·3	7 in 9	77·7	67 in 237	52·0
	Total I.		2 in 124	49 in 295	16·6	145 in 380	38·1	194 in 675	28·7	328 in 470	69·7	522 in 1,145	49·2
Hauts-Plateaux.	Gambetta ..	1914	0 in 44	61 in 275	22·1	106 in 213	49·7	167 in 488	34·2	—	—	167 in 488	—
	Barika ..	1916	0 in 61	69 in 446	15·4	233 in 556	41·9	302 in 1,002	30·1	—	—	302 in 1,002	—
	El Kantara ..	1918	2 in 25	4 in 35	—	54 in 126	42·8	58 in 161	36·0	6 in 7	85·7	64 in 168	64·2
	Méchéria ..	1922	0 in 4	4 in 37	—	49 in 127	38·5	52 in 164	31·7	125 in 196	62·7	177 in 360	47·2
	Total II.		2 in 134	137 in 793	17·2	442 in 1,022	43·2	579 in 1,815	31·8	131 in 203	64·0	710 in 2,018	47·9
Sahara.	Biskra	1922	0 in 101	80 in 194	41·2	154 in 262	58·7	234 in 256	51·3	182 in 246	73·9	416 in 702	62·6
	El Oued ..	1920	0 in 93	51 in 237	21·5	239 in 424	56·3	290 in 661	43·8	164 in 217	75·5	454 in 878	59·7
	Ouargla ..	1919	0 in 14	16 in 76	21·1	84 in 267	31·4	100 in 343	29·1	99 in 188	52·6	199 in 531	40·8
	El Goléa ..	1920	2 in 26	9 in 50	18·0	54 in 250	21·6	63 in 300	21·0	30 in 120	25·0	93 in 420	23·0
	Tremassinine ..	1918	—	1 in 13	—	1 in 18	—	2 in 31	6·4	11 in 45	24·4	113 in 76	15·4
	Tidikelt ..	1918	0 in 18	8 in 74	10·8	80 in 245	32·5	88 in 319	27·5	106 in 198	53·5	194 in 517	40·5
	Hoggar ..	1919	0 in 3	3 in 36	—	22 in 56	39·2	25 in 92	27·0	133 in 236	56·3	157 in 328	41·6
	Fignig	1911–14	0 in 11	3 in 93	3·2	38 in 205	18·5	41 in 298	13·7	69 in 176	39·2	110 in 474	26·4
	Touat-Gourara..	1913	0 in 19	11 in 99	11·1	49 in 136	26·3	60 in 235	25·5	194 in 337	57·5	254 in 572	41·5
	Total III.		2 in 285	182 in 872	20·8	121 in 1,863	38·7	903 in 2,735	32·9	988 in 1,763	56·0	1,891 in 4,498	42·0
Totals I, II and III.		..	6 in 543	368 in 1,960	18·7	1,308 in 3,265	40·0	1,676 in 5,225	32·0	1,447 in 2,436	59·4	3,123 in 7,661	45·7

* In this table the first figure (on left) gives the number of positive cuti-reactions; the second figure (on right) the number of cuti-reaction tests performed.

† Infants from 1 day to 1 year are not included in this total.

ALQUIER (A.). **Etude de l'infection tuberculeuse par la cuti-réaction à El Goléa (Oasis sahariennes).**—*Arch. Insts. Pasteur de l'Afrique du Nord.* 1922. Mar. Vol. 2. No. 1. pp. 111–113.

This brief paper should be read in connexion with that by PARROT and FOLEY in the same journal; its contents making an interesting commentary on their conclusions. The oasis of El Golea is one of the most completely isolated parts of North Africa, being 360 kilometres from the nearest centre. It is celebrated for the relative mildness of its climate, the abundance and purity of its water, and the beauty of its gardens. Its inhabitants number about 5,000 and consist of an Arab aristocracy, owning the land, but of nomadic habits and only residing at El Golea during the date harvest. The land is cultivated for them by negroes, the descendants of slaves brought from the Sudan by the Arab caravans in former days. The point brought out by the author is that, with a very low "index tuberculinique total," amounting to only 23 per cent., the disease is assuming a very severe and rapid type. It is a striking instance of the extreme susceptibility of persons hitherto uninfected and unprotected by contact with carriers of the germ. The author has a vivid style, and gives us an excellent pen picture of the lazy, improvident life of a North African oasis where, in spite of fair natural advantages, people starve because they are too lazy to work, and where hygiene is unknown.

S. L. C.

JAME (L.). **Etude de l'infection tuberculeuse en milieu nomade. (Annexe de Mecheria.—Hauts-Plateaux oranais.)**—*Arch. Insts. Pasteur de l'Afrique du Nord.* 1922. Sept. Vol. 2. No. 3. pp. 371–373.

This short paper deals with tuberculosis in the Annexe of Mecheria in the Hauts-Plateaux of Algeria, a region inhabited by nomadic tribes. The results of tuberculin tests are divided into those of the nomad tribes close to large fixed communities on the one hand and those of the remoter nomads on the other. Amongst the former, the "total tuberculin index" is 50·59 per cent.; amongst the latter, 45·35 per cent. The difference is chiefly to be noticed in the lower age groups; this being 37·56 per cent. amongst the children of those tribes in proximity to towns, but only 26·35 per cent. amongst the more distant tribes. The author attributes the increasing amount of tuberculosis amongst these communities to contact with Europeans in the towns and the return of infected soldiers from military service.

S. L. C.

SABRIÉ (R.). **La tuberculose dans quelques oasis des Ziban Zab Dahraoui (El Amri; Foughala; Farfar; El Bordj; Tolga).**—*Arch. Insts. Pasteur de l'Afrique du Nord.* 1922. Sept. Vol. 2. No. 3. pp. 358–370. With 1 map.

This communication deals with tuberculosis amongst the inhabitants of Zab Dahraoui, including the oases of El Amri, Foughala, Farfar, El Bordj and Tolga. Of these, the most populous and important is Tolga, a community of 2,500 persons, the terminus of the Biskra-Touggourt Railway, and the principal market centre of the area. Tables are given showing, for each oasis, the details of distribution of

positive tuberculin reactions (Von Pirquet) by age and sex. It will suffice to quote those given for the whole area, dealing with 1,113 observations, which are as follows :—

From 1 to 5 years	.. ..	37·06 per cent.
6 to 15 ,,	.. ..	59·83 ,,
1 to 15 ,,	.. ..	49·84 ,,
Adults ..	.. ..	74·56 ,,

The high percentage between 1 and 5 years of age is remarkable.

S. L. C.

ARCHIBALD (R. G.). **Tuberculosis in the Sudan, with Notes on a Case of Breast Tuberculosis in a Sudanese.**—*Ann. Trop. Med. & Parasit.* 1922. Oct. 18. Vol. 16. No. 3. pp. 235–242. With 1 plate.

This paper places on record a case of breast tuberculosis in a Sudanese woman of about 40 years of age, a native of the remote parts of Khordofan, where she had passed most of her life ; where, it would appear, the lesion was first noticed 16 years ago. The patient had come to Khartoum for treatment, and Archibald was enabled through the help of Dr. HODSON, M.V.O., to obtain and examine the breast after removal. The photographs reproduced, and particularly the microphotograph illustrating a single tubercle, are very convincing and, in the opinion of the reviewer, establish the diagnosis ; though, unfortunately, no inoculation experiments were carried out. The case is of considerable interest, as it is the first record of mammary tuberculosis yet noted from the Sudan. It is of epidemiological interest, too, in proving the existence of a chronic and well-balanced type of infection in a country where the acute and progressive manifestations of the disease have hitherto been the most commonly observed. The fact that the patient came from Khordofan, a district in which there is a large admixture of Arab blood, and where the Dongola slave merchants had established many trade centres before the days of Gordon, suggests that she may have been exposed in early life to the same conditions of subinfection that are associated with the chronic and "resisted" tuberculosis so often met with in European communities. It should be noted that this patient had a grown-up daughter in good health and free from signs of tuberculosis. A Von Pirquet test applied to the latter might have given interesting information. The author gives a brief description of the disease as met with in the Sudan, expressing views that correspond closely with those recorded by CUMMINS (1908). Points of importance, noted by Archibald, are as follows :—

There is a danger that, as the country develops and town communities grow up, the seeds of tubercle may "grow and be disseminated on what can only be considered a virgin soil."

"The disease appears to be more prevalent among adult males, but . . . racial customs . . . do not encourage the female population to seek medical advice. . . . The children of the Sudanese appear to be rarely affected. . . . Pott's disease is exceedingly rare, and tubercular meningitis more so. . . . Intestinal tuberculosis occurring as a primary affection of the intestines is exceedingly rare, *as would be expected in a country where animal tuberculosis is non-existent.*"

This paper, though of limited scope, is of great interest. It indicates, yet again, that the Sudan still presents a rich field for investigation

on the tuberculosis of isolated communities, a field that will become less interesting and instructive with each year that passes. Where inquiry is needed into such truly tropical diseases as malaria and sleeping sickness, England is always ready to find the men and the money for the work. Is it not strange that in the case of a disease which is one of our own greatest scourges, and the manifestations of which in our crowded industrial centres can only be comprehended in the light of its different behaviour amongst the inhabitants of isolated communities, we leave untouched problems that underlie not only the successful exploitation of coloured labour abroad but the happiness and well-being of our own people at home?

S. L. C.

PANAYOTATOU (Angélique G.). **Quelques cas de typhobacillose en Egypte.**—*Rev. Méd. et Hyg. Trop.* 1922. July–Aug. Vol. 14. No. 4. pp. 108–119.

This paper deals with five cases of tuberculosis, in all of which a period of typhoid-like pyrexia occurred. They are considered by Dr. Panayotatou to illustrate the condition described by LANDOUZY in 1882 as "Typhobacillose," and we agree that they fit in fairly well with the clinical picture to which this term was originally applied. To all engaged in the study of tuberculosis these typhoid-like pyrexias are familiar, though they occur under circumstances so varying, and have such different significance in different cases, that we think it a pity to classify them all under a heading that suggests a more or less pure septicaemia. A perusal of the five cases cited shows clearly how little they had in common except this period of indeterminate pyrexia. With the conclusion of the author, that in these doubtful cases there should be more frequent reference to the laboratory for assistance, we are in cordial agreement.

S. L. C.

i. PROCEEDINGS OF THE TRANSVAAL MINE MEDICAL OFFICERS' ASSOCIATION. 1922. June. Vol. 2. No. 2. pp. 1–3. (Discussion pp. 3–8.)—**Report of the Sub-Committee appointed by the Association to collect Data on the Incidence of, and Mortality from, Tuberculosis and Miners' Phthisis among Natives.**

ii. PROCEEDINGS OF THE TRANSVAAL MINE MEDICAL OFFICERS' ASSOCIATION. 1922. Aug. Vol. 2. No. 4. pp. 1–12.—[**Discussion on Tuberculosis.**]

i. This report of the sub-committee appointed by the Association to collect data on the Incidence of and Mortality from Tuberculosis and Miners' Phthisis among Natives, while brief and, unfortunately, in its published form, without a schedule of the statistical findings referred to in the text, is still a document of the highest interest and importance; while the discussion following the communication of the report to the Association is one that ought to be widely read not only by those interested in tuberculosis but by all those who desire to see the human individuals that constitute the Native Labour Contingents in our Colonies fairly treated.

The report discloses a rapid and terrible increase in the death-rate and repatriation-rate from tuberculosis throughout the mines; and a corresponding increase in the rates for silicosis and tuberculosis with silicosis.

"For tuberculosis the total number of cases (repatriated and died) in 1916 was 709, or a rate of 52 per 10,000; and in 1920 was 1,138, or 72·5 per 10,000. Similarly, for silicosis, the numbers and rates were as follows:—115 or 8·4 per 10,000 in 1916; 180 or 11·5 per 10,000 in 1920. For tuberculosis with silicosis, they were 100 or 7·3 per 10,000 in 1916; 239 or 15·4 per 10,000 in 1920."

These figures speak for themselves. It is recognized by the sub-committee that, while improved diagnosis has certainly been operative during the period in question, this factor "cannot entirely account for the very marked increases that have taken place." It would indeed be strange if faulty diagnosis had been so marked, in the past, as to lose sight of the true nature of diseased conditions so advanced as to lead to death and repatriation on this formidable scale, and we cannot help reading into the restrained expression of opinion of the sub-committee a note not far removed from irony when they say that improved methods "cannot entirely account" for figures that ought to awaken the liveliest concern amongst all those responsible for the recruiting and employment of native labour in the Transvaal. When we learn, in the discussion, from such an authority as Dr. IRVINE, that half of the total cases of pure tuberculosis are detected in the first six months and that, in his opinion, this means that "half of the total cases are boys with a pronounced lack of immunity to tuberculosis," we are already prepared for his conclusion that this loss occurring shortly after the start of work in the mines is due on the one hand to imported tuberculosis and, on the other, to tuberculosis originating in highly susceptible boys. For a possible explanation we turn to Dr. DODD's contribution to the discussion. He says: "I think it is an example of the most vicious circle that was ever created in any country, and that is that we repatriate a very large number of highly infectious boys to their kraals and then we are surprised when their successors develop tuberculosis at an early stage of work. He adds his view that "if we are going to search for the cause of this increase we must go into the territories," and in that conclusion he is clearly right. Now here is a situation of great interest. The medical men of the Transvaal mines and the highly expert staff of the Bureau for the investigation of the diseases of the miners are at one in calling attention to a terrible mortality from tuberculosis amongst the native workers. It is fully realized that the native recruits to the mines are highly susceptible to the disease. The inference is clear that the repatriation of persons found to be suffering from this infective condition must necessarily be a serious danger to their associates when they regain the crowded and insanitary kraals of their native villages and mix once more with the admittedly highly susceptible populations of the interior. A vicious circle indeed. And yet the obvious remedy is ignored. Dr. ORENSTEIN, in commenting on this point, says:—

"There are a great many things that might be done in this country that apparently one cannot get done. For instance, we repeatedly urged on the Government the advisability of appointing some persons to go into the Territories and collect actual facts about tuberculosis in the Territories. This was one of the recommendations of the De Villiers Commission. . . . It was put forward again by private members during the present Session and turned down by the Minister of Mines because there was no money, I understand."

It is really about time that those responsible for the lives of large numbers of subject races became aware of their obligation to listen to what the medical profession has to say. The policy of gathering

together into the trammels of industrial work large detachments of susceptible persons and repatriating to their native homes the infected victims of a disease that is essentially one that spreads from man to man under home conditions is not, on the face of it, a sound business proposition. On humanitarian grounds, too, something might be said of this "most vicious circle that was ever created in any country."

ii. The discussion now recorded is the outcome of the desire expressed at the former meeting that information as to the actual state of things in the territories from which native mining recruits are drawn, and to which they return if invalided, should be made available. In order to obtain light on this question, it had been decided to invite certain medical and other persons from amongst those working at the examination and selection of recruits in the territories to attend a meeting of the Society, and the guests included Drs. WELSH and ALLEN, Colonel VILLIERS, Chairman of the Native Recruiting Corporation, Ltd., Mr. SMITH, Secretary of the Witwatersrand Native Labour Association, and Major WELSH of the Defence Force.

Dr. WELSH addressed the meeting and gave his views as to the actual conditions in the territories with regard to the medical inspection of recruits, the present distribution of tuberculosis amongst the natives and the question whether there is much danger of spreading infection through the repatriation of tuberculous miners. The degree of precision in detection of early tuberculosis amongst these recruits may be gathered from the description given: "We stethoscope every boy that comes along," "You have to go through from 60 to 100 boys in an hour or an hour and a half and by the time you get to the end the ear is not quite so acute in detecting sound," "Many of the boys have crepitations and other signs in the chest." Now it is undeniable that a physician with experience of natives can weed out the acutely ill in the course of a very rapid inspection, and all who know Africans at first hand will agree that the general condition, the skin, the eyes, the teeth and so forth give admirable indications as to the general fitness of a recruit; but when it is a question of detecting early or even fairly advanced signs of pulmonary tuberculosis, not even that much trusted implement, the stethoscope, can be looked upon as likely to help much when 60 men have to be examined in an hour and a half; to say nothing of 100 in an hour! It is clear from what Dr. WELSH says that the examination is of little use so far as concerns tuberculosis, though it is probable that it serves to weed out the actual weaklings if conducted by a man, such as Dr. WELSH clearly is, of great experience in the inspection of recruits.

Next as to the prevalence of tuberculosis in the territories, here, too, the information available is far from sufficient. To quote Dr. WELSH, "the Native Territories are a large place; they cover an area of something like 17,000 square miles, nearly two-thirds the size of Scotland, with a population of about one million natives scattered over this area, an essentially rural population with no large native towns or cities; and as there are no statistics at all kept, it is impossible to give definite figures of any kind." It must therefore be admitted that nothing precise is known upon this essentially important problem upon which the whole future of the staffing of the mines as well as the health and happiness of a subject race may perhaps depend; and all we can say is that the sooner steps are taken to find out about it the better.

While this absence of exact knowledge is deplorable, the paper read by Dr. WELSH throws much valuable light upon certain aspects

of the tuberculosis problem and the impressions of an experienced doctor are often more significant than ill-compiled and badly-collected statistics. It is of great interest to find that the impressions of both Dr. WELSH and Dr. ALLEN are to the effect that the disease is lessening in severity. Dr. WELSH is "satisfied" that he sees "less tuberculosis than ten years ago." Dr. ALLEN says "I can speak for Zululand, which I have investigated very thoroughly, and I can say that tuberculosis is certainly diminishing."

In the discussion which followed, Dr. ORENSTEIN asked the pertinent question as to whether a process of gradual immunization was tending to produce amongst the natives a type of tuberculosis like that met with in Europe. In reply, Dr. WELSH said that at one time tubercolosis "seemed to be spreading so rapidly and seemed so hopeless to deal with" that he thought that the native question would soon settle itself. But he goes on to say "I am satisfied that the type of disease as it exists now is much more like that found in European countries, though I do not think it has reached that type yet."

It is very interesting to speculate as to how far the introduction of infected persons into such a scattered community as the Native Territories can spread disease on the one hand or immunity on the other. We tend to the opinion that the rapidly fatal course of the disease in Africans is likely to lead to a rapid elimination of the infective subjects, thus lessening their powers of spreading infection; that the open-air life is likely to limit infection to the immediate circle of relatives inhabiting the same kraal as the patient, since close contact will only be possible indoors; and that the spread of the disease as well as of acquired resistance to it are both likely to be slow. It would seem, indeed, that but little resistance is as yet manifest amongst the natives that come to work in the mines, and it is certain that the Native Labour Corps serving in France were extremely susceptible to tuberculosis. It is probable that, in a population such as that described by Dr. WELSH as inhabiting the Native Territories, a balance of slight but still significant resistance and slowly spreading infection suffices to explain the diminution of cases noted, but that the degree of resistance is far too slight to be of account under the more intense conditions of infection met with at the mines.

S. L. C.

MITCHELL (J. A.). **The Nelspoort Tuberculosis Farm Sanatorium Scheme and Tuberculosis Clinics.**—*Med. Jl. S. Africa.* 1922. Aug. Vol. 18. No. 1. pp. 8–10.

Through the generosity and initiative of Mr. John GARLICK, of Capetown, who gave a sum of £25,000 towards a sanatorium on condition that local authorities contributed a like sum and the Government £50,000, it has been possible to obtain a total of £108,000 and to start work on the building of an institution which should become the nucleus of an important tuberculosis service for the Cape Province in the future. Such a service is urgently needed, since it is estimated that there are at least 4,000 white and 20,000 coloured cases of active tuberculosis in the Union, of which 3,000 white and 15,000 coloured are in the Cape Province. A suitable site has been found in a wide valley in the Nieuweveld Mountains, through which the Salt River flows southward. The sanatorium will accommodate, when completed, about 92 patients, white and coloured; and the addition of cheap shelters and chalets is contemplated if further beds are found necessary.

To complete the scheme, the organization of tuberculosis clinics and the other adjuncts in use elsewhere will be required, and it is hoped that these will be provided. Such a scheme should afford unexampled facilities for contrasting the manifestations of tuberculosis in Europeans and African natives, a subject on which much information is required for the comprehension of this disease.

S. L. C.

WIEBERDINK (Tj.). **Chirurgische Tuberculose en zee-klimaat in Indië.** [Surgical Tuberculosis and Sea Climate in the East.] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1922. Vol. 62. No. 3. pp. 243–252. With 1 text fig.

Wieberdink treated 11 cases of surgical (bone and glandular) tuberculosis by exposure to the sun on the small island of Onrust, near Batavia. In one case the diagnosis was doubtful, in one of the remaining 10 there was no apparent influence, but in the other cases the author noted very favourable results of 5–7 months' treatment. A few of his cases had been treated in the same way in the town of Batavia before without any appreciable effect. The result was better in cases of superficial than in deeper seated affections.

W. J. Bais.

PURDY (J. S.). **Silicosis, Miners' Phthisis and Medical Inspection.**— *Med. Jl. Australia.* 1922. Aug. 26. 9th Year. Vol. 2. No. 9. pp. 234–235.

The author gives, in his initial paragraphs, several quotations from the works of E. L. COLLIS on the relation of silicosis to phthisis and on the preventive action of certain clays in relation to the action of silica in the lungs. A summary of the findings of the Broken Hill Commission on Pneumokonioses is then given, and mention is made of the objections raised by the workers to the introduction of a system of medical examination of miners such as obtains under the Miners' Phthisis Medical Bureau in South Africa. The brief paper finishes with an interesting communication sent to the author by Dr. Watkins PITCHFORD, in which the South African methods and the results obtained are described. The communication concludes as follows :—

"One is surprised to hear a rumour that there is opposition on the part of the workers in Australia to the principle of systematic medical supervision of the health of the miners. As far as the Witwatersrand is concerned, it is safe to say that any proposal to abolish such supervision would be strenuously opposed by the workers."

S. L. C.

FRY (A. Sargood). **Clinical Pictures of Tuberculosis in Relation to Bones and Joints.**—*Indian Med. Gaz.* 1922. Jan. Vol. 57. No. 1. pp. 7–9. With 1 plate.

This short paper is an account of some cases of surgical tuberculosis treated by the author. They have little or no bearing upon tropical tuberculosis as such, but are of interest as clinical pictures. It is worth noting that, in the first case, one of *caries sicca* of the hip joint in a sepoy, after a most ominous beginning with wasting and emaciation, the patient took a sudden change for the better a month after a dose of sodium morrhuate. As a matter of fact, the drug had been stopped for some reason or other and a course of cod liver oil

by the mouth substituted; but, as pointed out by the author, had the morrhuate been continued, it would have been difficult to avoid attributing the good result to the drug. This little episode serves well to show the need for extensive trials and thorough controls before success is claimed for any given remedy in such a many-sided disease as tuberculosis.

S. L. C.

KOLMER (John A.), DAVIS (Luther C.) & JAGER (Rudolph). **The Influence of Chaulmoogra Oil on the Tubercle Bacillus.**—*Jl. Infect. Dis.* 1921. Mar. Vol. 28. No. 3. pp. 265–269.

The authors worked with oil expressed cold from seeds of *Taraktogenus kurzii* King, and with a strain of bovine tubercle bacilli virulent for guinea-pigs. The technique employed was that of MCMASTER, Petroff's solid medium being substituted for agar slants and 24-day cultures used. The dilutions of the oil were made in sterile paraffin. The 24-day cultures were exposed for 24 hours to the action of the oil, which was poured over them so as to cover the growth, the tubes being kept at 37·5° C. After exposure, the oil was removed and the cultures washed and reinoculated on to fresh tubes of the medium, which were incubated for three weeks and examined. Growth was always obtained. Lest the technique just described might possibly lead to a failure to obtain contact between the chaulmoogra oil and every part of the culture, another method was tried, the bacilli being ground up with sterile paraffin and 0·1 cc. of the emulsion placed in flasks along with 10 cc. of each dilution of the oil. After 18 hours shaking at room temperature the mixture was inoculated into a guinea-pig. Of 13 guinea-pigs so treated all died of tuberculosis. Attempts were made, too, to prevent the development of tuberculosis in already infected guinea-pigs by the inoculation of the chaulmoogra oil, but in vain. The salts of the fatty acids were not tried.

S. L. C.

FERREIRA (Clemente). **Liga Paulista contra a Tuberculose. Exercicio de 1920. Relatorio apresentado á Assembléa Geral na Sessão ordinario de 25 de Maio de 1921.**—75 pp. With 1 chart. 1921. Sao Paulo: Martinelli, Passos & C.

This long and complete report on the working of the "Clemente Ferreira" Model Dispensary, while full of useful information for those engaged on tuberculosis schemes, lends itself but poorly to the purposes of a summary and must be perused in the original to be appreciated. There is one portion, however, dealing with the treatment of pulmonary tuberculosis by means of sodium morrhuate after the method of Sir Leonard ROGERS and Dr. MUIR, which is of immediate interest to the student of tuberculosis, whether in the tropics or elsewhere; and we shall confine our remarks to this section.

After quoting the article by ROGERS in the *British Medical Journal* of February 8, 1919, and the work of MUIR, KNOWLES, COCHRANE, BRIERLEY and DAVIES [see this *Bulletin*, Vol. 16, p. 193], the author describes his own work with this drug. The observations are based on nine cases, six with more or less chronic bilateral pulmonary tuberculosis and three with severe and progressive disease. Each individual case is minutely described and the progress recorded during treatment. For the most part, the drug was given by intramuscular injection, in doses of ½ to 1 cc. and upwards of a 3 per cent. solution,

as used by MUIR. In certain cases, the intravenous route was used, especially where the intramuscular method appeared to give rise to reaction and difficulty. In one case as many as 49 injections were given, in another 36, and so on. In one case (No. 8) the treatment was discontinued after ten injections.

The results in the "balanced" cases were decidedly favourable. Four of the patients were so much improved as to be classified as "arrested," bacilli disappearing from the sputum, the volume of sputum becoming greatly reduced, and the patients gaining in weight and returning to health. In the "progressive" cases little or no good resulted. It would appear that the injections led to no undesirable results, thus contrasting with tuberculin which, in the hands of Ferreira, has sometimes led to trouble. The series of cases, though small, has been well observed and carefully recorded, and it is clear that the results tend to be encouraging in the more favourable clinical types. It must be remembered that it is just such types that often benefit by the advice, assistance and general optimism that goes with attendance at a dispensary, and it is necessary to preserve a critical attitude as to the results obtained by any form of "therapy" that coincides with general attention to the patient's welfare; but a case has been made out for an extended trial of the morrhuate in pulmonary tuberculosis.

S. L. C.

HEINEMANN (H.). **Antikörperstudien bei Tuberkulose. Die Komplementbindungsreaktion bei Tuberkulose und ihr Malariafehler.** —*Muench. Med. Woch.* 1922. July 14. Vol. 69. No. 28. pp. 1035–1037.

Tuberculosis is rare in Java and the Von Pirquet index is as low as 5–10 per cent. The author has taken the opportunity of trying out the complement-deviation test with old tuberculin as "antigen" in a large number (1,200) of persons free, for the most part, from infection with the tubercle bacillus, but including a number of persons with malaria.

He finds that a large proportion of those with active malaria gives a positive "Tuberculin-Wassermann" (T.W.) reaction, which is of a temporary nature and tends to disappear when the parasites are no longer to be found in the blood. As he points out, this fact must be given careful consideration in interpreting complement-deviation tests for tuberculosis in patients who have been exposed to malaria. That this phenomenon of a positive T.W. reaction during active malarial infection is unconnected with syphilis is shown by the fact, proved by Heinemann, that the "T.W." is often positive when the Wassermann, the Sachs-Georgi and the Meinicke reactions are all negative.

The theories to account for this T.W. reaction in malaria are not very convincing, and for further information about them the original paper should be consulted. From the point of view of tuberculosis, it would have been very interesting to hear from the author how many of the non-malarial and "Von Pirquet-negative" persons examined proved positive and how many negative to the complement-deviation test with tuberculin, and it is hoped that this information may be given in a subsequent communication.

S. L. C.

DE GREGORIIS (Antonio). **Tisis y Tuberculosis. Investigaciones de los Professors Ferrán y Otto von Schrön.**—*An. del. Depart. Nac. Hig.* Buenos Ayres. 1921. May & June. Vol. 27. No. 3. July & Aug. Vol. 27. No. 4. pp. 151–155; pp. 195–197.

We had thought that the old controversy between the "Dualists" and the "Unicists" had died with the work of VILLEMIN and Robert KOCH; but it seems that this is not the case. To those who seek support for the Dualistic view, these brief papers describing the views of Otto von SCHRÖN as to the separate etiology of phthisis and tuberculosis will doubtless appeal. Here they will find set out in tabular form the eleven stages of the phthisiogenic organism of von SCHRÖN. A third communication is promised, and this may perhaps mention some of the evidence that is held to support the association of this pleomorphic germ with phthisis and tabes mesenterica.

S. L. C.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

ERRATUM.

BLANCHARD (M.) & LEFROU (G.). **Présence de spirochètes dans le sang d'européens atteints de fièvre bilieuse hémoglobinurique. Le problème étiologique de cette spirochétose.**—*Bull. Soc. Path. Exot.* 1922. Oct. 11. Vol. 15. No. 8. pp. 699–722.

As kindly pointed out to me by Prof. MESNIL the review of BLANCHARD and LEFROU's paper in the last issue of the *Bulletin* [Vol. 20. No. 2. p. 139, first paragraph] contains a mistake. The name *Spirochaeta biliohaemoglobinuriae* was proposed by BLANCHARD and LEFROU for the organism which they discovered in order to distinguish it from that described by SCHÜFFNER which was named by him *Spirochaeta icterohaemoglobinuriae*. The review incorrectly states that BLANCHARD and LEFROU's name was the same as that of SCHÜFFNER.

C. M. Wenyon.

HELMINTHIASIS.

NICOLL (William). **Observations on the Occurrence and Prevalence of Parasitic Intestinal Worms during the War.**—*Lancet.* 1922. Nov. 18. pp. 1049–1052.

During the later years of the war the author had several opportunities of making observations on the occurrence of worm parasites in civilians and in soldiers suffering from dysentery and other intestinal infections. About 80 per cent. of the cases coming under routine examination harboured entamoebic cysts. There was a residue of 10 per cent., which did not show infection with either pathogenic bacteria or protozoa, but which harboured parasitic worms which were apparently a causal factor in enteritis. The author makes an exhaustive analysis of the literature of the common intestinal helminth infections (excluding those of military significance which called for special investigations, *e.g.*, Bilharzia), and he concludes that the sanitary authorities are not sufficiently alive to the rôle played by the commoner infestations which too often are dismissed like the measles as "common, and therefore harmless."

R. T. Leiper.

SCHWARTZ (Benjamin) & TUBANGUI (Marcos A.). **Uncommon Intestinal Parasites of Man in the Philippine Islands.**—*Philippine Jl. Sci.* 1922. June. Vol. 20. No. 6. pp. 611–618.

In the course of examinations of more than 500 students of the University of the Philippines, between the ages of 20 and 30 years, the following cases of infestation with platyhelminths were noted.

(*a*) Three cases of Taenia infection of which one was identified as *T. saginata.* Over 1 per cent. of the native hogs are found annually to be infested with *Cysticercus cellulosae* and these are condemned by the public health authorities. No data are available with regard to the incidence of *Cysticercus bovis* in native cattle as these are seldom slaughtered in Manila. The native cattle are consumed in the provinces where there is no meat inspection. The cattle slaughtered in Manila are usually imported from French Indo-China.

(*b*) A case of infestation with *Hymenolepis diminuta,* found in a male student aged 20 years.

(*c*) An imported case of *Clonorchis sinensis* in a Chinese student from Canton is mentioned. The parasite has not yet been recorded from Filipinos.

(*d*) Two new cases of infestation with *Echinostoma ilocanum* ; both in students from Luzon.

R. T. L.

MOSS (Emma Sadler). **Nematode Infestation in Patients at United States Veterans' Hospital No. 45, Biltmore, N.C.**—*Public Health Rep.* 1922. June 16. Vol. 37. No. 24. pp. 1457–1458.

Most of the patients examined were veterans of the Great War, and few, if any, had been admitted for treatment of intestinal parasites. Of 597 patients examined, 43 per cent. were infested.

Hookworm	25·4 per cent.	Twenty patients had a double infection and one a triple infection.
Trichuris	7·3 per cent.	
Ascaris lumbricoides ..	6·3 per cent.	
Strongyloides ..	4·0 per cent.	

A comparison is made with results obtained by STILES, who found a total infection of 7·3 per cent., his cases being taken from 23 States, whereas this report dealt almost wholly with patients from 7 Southern States.

R. T. L.

SIMONIN (P.). **Intoxication vermineuse et glandes endocrines.**—*Rev. Méd. de l'Est.* 1922. May 15. Vol, 50. pp. 314–325. With 1 plate. [Summarized in *Brit. Med. Jl.* (Epitome of Current Medical Literature.) 1922. Aug. 19. p. 21.]

Recent work on the action of "foreign proteins" has advanced the knowledge of the toxins resulting from intestinal helminth infections. The toxins giving rise to the observed symptoms include both secretions of the worm and toxic substances resulting from the disordered metabolism of the infected host. Experimental work upon the action of these toxins upon the endocrine organs is in full accord with the results of clinical observations. The author considers that toxic cellular degeneration of the liver, pancreas and suprarenals, gives rise to a glandular insufficiency resulting in an interference with the oxidation of carbohydrates and hydrocarbons; which accounts for the rapid emaciation often observed in cases of infection with intestinal worms. This condition is often accompanied by excess of nitrogen bodies and phosphates in the urine, indicating abnormal tissue katabolism. Cachexia may be due to the dual effect. In children and young persons growth and development may be seriously interfered with, and infantilism attributable to ankylostomiasis has been noted in Tunis and Porto Rico. He considers that the worms have a definite toxic action on the ovaries, resulting in the menstrual disorders often recorded in connexion with helminthiases; further, even after removal of the worms the toxic effect has caused numerous abortions recorded by TRIDONDANI. Comparative pathology is quoted, and a number of plates illustrate the degenerative changes produced in the endocrine organs by infections of fluids from hydatid cysts, ascarids, etc.

R. T. L.

GUILLAIN (Georges) & GARDIN (Ch.). **Contribution à l'étude des méningites de l'helminthiase.**—*Bull. Acad. Méd.* 1922. Mar. 14. Vol. 87. No. 11. pp. 308–316.

A study is made of the cerebrospinal fluid of a case of pseudo-meningitis of known helminthic origin. A girl, aged 19 years, had been infected with a taenia for six months, but as she was pregnant she had not attempted to expel the worm. A normal labour in October resulted in a living child. Severe frontal headache and vomiting began December 15 and she was admitted five days later. Her condition resembled tubercular meningitis in every respect save the absence of the Koch bacillus in the cerebro-spinal fluid; the symptoms persisted until January 3, when, after a vermifuge was given, immediate improvement was observed and in one week she was completely cured.

R. T. L.

GIRBAL (E.). **Les pseudo méningites vermineuses de l'enfant.**—*Gaz. des Hôpit.* 1922. Mar. 25. Vol. 95. No. 24. pp. 373–376.

The characteristics of pseudo-meningitis due to helminthiasis are:—

(*a*) Sudden crisis without high fever.

(*b*) Absence of the characteristic cry, of colouration of the cheek-bones, and of coma.

(*c*) Rarity of strabismus and of complete loss of intelligence.

(*d*) Patient is in apparently good health between the attacks.

(*e*) Lumbar puncture shows slight hypertension of cerebro-spinal fluid, but no bacteria or albumin.

The diagnosis is made by the examination of :—

(*a*) The stools for helminth ova, and after an anti-helminthic, for the worms themselves. Charcot-Leyden crystals may be looked for.

(*b*) The urine treated with acid mercuric nitrate, is found by DEFINIOR to give a characteristic reaction.

(*c*) Differential leucocyte count shows marked eosinophilia.

The differential diagnosis is made on the following points :—

Tetanus and cerebro-spinal fever are distinguished readily. The presence of bacteria in the cerebro-spinal fluid and the absence of a cellular reaction indicates septic meningitis. Presence of blood in the cerebro-spinal fluids points to haemorrhagic meningitis. The differentiation from tubercular meningitis is difficult ; an examination of the stools and blood is essential in all cases.

The paper opens with an historical summary and closes with a bibliography ranging over the last 50 years.

R. T. L.

USAMI (Kenichi) & KAMADA (Ryonosuke). [**Question on the Use of Gauze Filters in the Collection of the Eggs of Human Parasites.**]—*Iji Shimbun* (*Medical News*). 1921. Feb. No. 1613. [Summarized in *Japan Med. World.* Tokyo. 1921. June 20. Vol. 1. No. 2. p. 23.]

Gauze filters will retain on their surface two-thirds of the eggs from a watery emulsion filtered through them. The proportion appears unaffected by the concentration of eggs in the emulsion, by one or two thicknesses of gauze, by the addition of chemicals, or by the use of refined cotton.

R. T. L.

HENRY (T. A.). **Some Recent Work on Anthelmintics.**—Reprinted from *Jl. Soc. Chemical Industry.* 1922. Nov. 15. Vol. 41. No. 21. pp. 467r–469r.

This is a review of the attempts to produce synthetic anthelmintics ; most of these compounds are phenol derivatives, especially phloroglucinols and resorcinols. FRÄNKEL suggested that butyric and isobutyric residues were found in most anthelmintics. KARRER, working on these lines, though erroneous, has prepared many acyl derivatives of the phenols ; the best being reso*iso*hexophenone and phloro*iso*hexophenone. The naturally occurring compounds of this class increase in anthelmintic efficiency, but the synthetic compounds become less active with increasing complexity of the molecule. Probably all simple mono-, di- and tri-hydroxy phenols are anthelmintics ; their therapeutic value depending on their relative absorption by, and toxicity for, the host. Attempts have been made to diminish this toxicity by the esterification of alkyl phenols ; but most of the esters and all the ethers are quite useless. Dr. SMILLIE found the only active constituent of Chenopodium oil to be the organic peroxide ascaridole. The dimethyl-naphthalene ring in santonin may

be replaced by a benzene, or a substituted benzene ring ; substitution with alkyl groups increasing, and with aryl groups diminishing, the efficiency. The activity of santonin is attributed, by LAUTENSCHLÄGER and TRENDELENBURG, to the lactone ring ; and basing their conclusions on experiments with worm musculature, they state that the sodium salt is inactive. Nevertheless, the introduction of a second lactone ring diminishes the anthelmintic action ; and salts of santonic acid have been used in therapeutics, though the toxicity of the sodium salt has caused it to be abandoned.

R. T. L.

MCVAIL (J. Borland). **Carbon Tetrachloride in Helminthiasis. A Preliminary Note.**—*Indian Med. Gaz.* 1922. Aug. Vol. 57. No. 8. pp. 290–291.

In addition to the known value of carbon tetrachloride in hookworm, evidence is given that it is of great value against oxyuris, but of little use for ascaris, trichuris and *Hymenolepis nana.* The dose used for adults was 60 minims, given in some cases on two successive days, and sometimes in castor oil to obviate the use of the expensive hard gelatine capsule. No starvation or purgative was enforced, the drug was taken usually two hours after a meal and four hours were allowed to elapse before the next meal. This drug is recommended for ankylostomiasis in cases of kala azar when chenopodium is contra-indicated.

R. T. L.

HALL (Maurice C.). **Carbon Tetrachloride as an Anthelmintic.**—*Amer. Jl. Trop. Med.* Baltimore. 1922. Sept. Vol. 2. No 5. pp. 373–379.

Carbon tetrachloride is an efficient anthelmintic for blood-sucking strongyles and certain other nematodes, but used alone it is not effective for tapeworms though in combination with thymol it acts well. Toxic impurities to be guarded against are phosgene ($COCl_2$) and carbon bisulphide (CS_2). It is very important to prevent inhalation, so the drug is best administered in hard gelatine capsules. No purge is needed as peristalsis is increased by carbon tetrachloride and the drug is very little absorbed in the small intestine. Castor oil should never be given when capsules are used. If desired a saline purge is advised three hours after the capsules are taken.

R. T. L.

LAKE (G. C.). **Carbon Tetrachloride. A Drug proposed for the Removal of Hookworm, with Special Reference to its Toxicity for Monkeys when given by Stomach Tube in Repeated Doses.**—*Public Health Rep.* 1922. May 12. Vol. 37. No. 19. pp. 1123–1126.

The administration of large repeated doses of carbon tetrachloride to four monkeys showed that the drug produced no untoward symptoms when administered by a stomach pump. Two animals were later killed and no macroscopic or microscopic lesions of the viscera were observed. Stress is laid on the importance of giving the drug

in hard gelatine capsules to prevent inhalation, and on the fact that no purgative is necessary at the time or subsequent to the administration of carbon tetrachloride, since this drug tends to increase peristalsis. The doses employed were 10 to 40 times the dose per kilo of body weight for man and were repeated 12–16 times.

R. T. L.

DOCHERTY (J. F.) & BURGESS (E.). **The Action of Carbon Tetrachloride on the Liver.**—*Brit. Med. Jl.* 1922. Nov. 11. pp. 907–908.

Availing themselves of the opportunity of administering carbon tetrachloride to three condemned men, the authors gave 5 cc. in two instances and 8 cc. in the third (in two doses) on an empty stomach, followed by a saline purge, three and a half hours later in the first case and eight hours later in the second; the third received none. At the autopsies, from 6 to 14 days later, in case 1 the liver was normal, in cases 2 and 3 there was granular (2) and fatty (3) degeneration of the liver cells. The authors conclude that the 5 cc. dose is on the danger line, and advise 3 cc., which they have given in many instances in Ceylon. They agree with other observers that the drug is practically specific for ankylostomes, and fairly efficient in the removal of round and thread worms.

A. G. B.

ANNANDALE (N.) & SEWELL (R. B. Seymour). **Progress Report on a Survey of the Freshwater Gastropod Molluscs of the Indian Empire and of their Trematode Parasites.**—*Indian Jl. Med. Res.* 1920. July. Vol. 8. No. 1. pp. 93–124.

The hill stations of India are singularly free from aquatic molluscs. There is danger, however, that they may be brought from the plains as food for introduced fish. In the plains the predominant genera are *Bythinia, Vivipara, Limnaea, Gyraulus, Pachylabra, Melanoides, Cremnoconchus, Mysorella,* and *Camptoceras* in the Gangetic plain.

R. T. L.

BAKER (Frank Collins). **Fluke Infections and the Destruction of the Intermediate Host.**—*Jl. Parasit.* 1922. Mar. Vol. 8. No. 3. pp. 145–147.

Attention is drawn to the fact that, whilst CHANDLER's suggestion for eradicating the snails which serve as intermediate hosts in fluke infections of man and animals by the use of copper sulphate is admirably adapted to small and isolated bodies of water, its general application to streams would rapidly eliminate all the fish and also the fresh water-mussel.

R. T. L.

NOC & NOGUE. **Parasitisme hépatique chez les indigènes de l'A.O.F.**—*Bull. Soc. Méd.-Chirurg. Française de l'Ouest-Africain.* 1920. June. Vol. 2. No. 6. pp. 171–172.

In a note written from the Central Native Hospital at Dakar in West Africa two cases are recorded of *S. haematobium* and a case in which there were the characteristic eggs of *Dicrocoelium lanceatum* in a Senegalese.

R. T. L.

i. TANABE (Hiroshio). [**Studies on the Trematodes with the Fresh Water Fish as the Intermediate Host. I.** *Stamnosoma armatum* **n.g. n.sp.**] —*Kyoto Igakkwai Zasshi* (*Jl. of Kyoto Med. Soc.*). 1922. Apr. Vol. 19. No. 3. [Summarized in *Japan Med. World.* Tokyo. 1922. Sept. 15. Vol. 2. No. 9. pp. 263–264.]

ii.——[**Studies on the Trematodes that** [**use**] **the Fresh Water Fish as their Intermediate Hosts. II. On the Japanese** *Echinochasmus Perifoliatus* (**Ráts**).]—*Okayama Igakkwai Zasshi* (*Jl. Okayama Soc.*). 1922. Apr. No. 387. [Summarized in *Japan Med. World.* Tokyo. 1922. Sept. 15. Vol. 2. No. 9. p. 270.]

i. Encysted cercariae occurring in certain species of Cyprinidae develop to adult worms in about a week after feeding to dog, rabbit, rat, mouse and man. The cat and an [unnamed] bird are said to be the natural definitive hosts. The species is named "*Stamnosoma armatum*" n.g., n.sp., but no description is given in the translation. The eggs are said to resemble those of *Clonorchis sinensis* very closely.

ii. The trematode *Echinochasma perfoliatus* Rátz occurs in the cat in Okayama. The encysted cercaria occurs in the gills of 11 species of fresh water fish. The dog and cat are readily infected and the author has succeeded in infecting himself voluntarily.

R. T. L.

CORT (William W.) & YOKOGAWA (Sadamu). **A New Human Trematode from Japan.**—*Jl. Parasit.* 1921. Dec. Vol. 8. No. 2. pp. 66–69. With 1 plate.

In Japanese literature, written in Japanese orthography, are many important observations which have not come under the notice of Aryan students. Among these is a paper published in Japanese in 1915 by ONJI and NISHIO describing the structure and life-history of a new fluke, *Heterophyes nocens*. This parasite closely resembles *H. heterophyes*. It varies from 0·9 to 1·1 mm. in length and 0·4 to 0·52 mm. in breadth. There are about 60 rodlets guarding the common genital pore. The sizes of the body and of the suckers differ from those of *H. heterophyes*. The rodlets are fewer and the intestinal caeca in the adult are unequal in extent. The cutaneous spines have no serrations on their free margins. The encysted cercaria occurs in *Mugil cephelus* and were identified by successful feeding experiments. [The title is misleading; this paper gives a transliteration of the results of ONJI and NISHIO's work.]

R. T. L.

LANE (Clayton). **A Note on** *Heterophyes nocens* **as a Distinct Species of Trematode Parasite.**—*Lancet.* 1922. Sept. 2. p. 505.

Commenting upon the recent paper [see above] by CORT and YOKOGAWA on *H. nocens*, Onji and Nishio, 1915, the author gives reasons which lead him to confirm LEIPER's view that this species is identical with *H. heterophyes*. Measurements are given based upon material from a Japanese patient treated apparently in the Albert Dock Hospital. It was from several cases in the same hospital that LEIPER originally reported the occurrence of *H. heterophyes* amongst Chinese and Japanese.

R. T. L.

CORVETTO (Anibal). **Paragonimiasis pulmonar.**—*Cronica Méd.* Lima. 1921. July. Vol. 38. No. 697. pp. 246–252.

The author gives three reasons for recording a case of *Paragonimus westermanii* infection: (1) its rarity, this being the sixth recorded in his country; (2) to point out the means by which the spread of the condition can be prevented; (3) because of its value to clinicians disposed to regard all haemoptysis as tuberculous in origin.

The patient was a mechanical engineer who served in 1916 in a submarine and later on a cruiser. In 1917, when living in La Libertad, temporary attacks of haemoptysis occurred, with a certain amount of constitutional disturbance lasting for several days, but these cleared up. A troublesome dry cough recurred in the intervals, and there was blood-stained mucoid expectoration during the attacks.

In December, 1919, beyond a slightly altered percussion note and a few sibilant rhonchi, there were no physical signs of importance. Four and a half months later numerous ova of *Paragonimus westermanii*, but no tubercle bacilli, were found in the sputum.

H. Harold Scott.

ANDO (Ryo). [**Studies on the Determination of the First Intermediate Host of** *Paragonimus westermanii*.]—*Chuo Igakkwai Zasshi* (*Jl. of Central Med. Soc.*). 1921. Mar. No. 155. [Summarized in *Japan Med. World.* Tokyo. 1921. July 15. Vol. 1. No. 3. p. 23.]

The miracidia hatched experimentally from eggs of *P. westermanii* attack and penetrate into the body of a freshwater snail [not specified]. The larvae metamorphosed in the snail into sporocysts.

R. T. L.

SUYEMORI (Susumu). [**On the Pathology of the Parasitism of** *Paragonimus westermanii* **in the Orbital Cavity and the Lid (II. Report).**]—*Taiwan Igakkwai Zasshi* (*Jl. of Formosan Med. Soc.*). 1922. July. No. 223. [Summarized in *Japan Med. World.* Tokyo. 1922. Nov. 15. Vol. 2. No. 11. p. 333.]

Successful experimental infestation is recorded, and its pathology described with minute particulars of the microscopic appearances.

R. T. L.

IKEDA (Seiichi). [**Contributions to the Knowledge of Cerebral Soft Cyst and Proliferation of the Glia in the Cerebral Foci in Pulmonary Distomiasis.**]—*Jukwa Zasshi* (*Jl. of Pediatrics*). 1922. July. No. 266. [Summarized in *Japan Med. World.* Tokyo. 1922. Nov. 15. Vol. 2. No. 11. p. 330.]

Paragonimus migrating to the brain, apparently by way of the tissues around the cervical blood vessels and nerves, was found to be the cause of a cerebral soft cyst.

R. T. L.

ANDO (Ryo). [**Can Immunization be obtained by the Infestion of** *Paragonimus westermanii* **?**]—*Iji Shinbun* (*Med. News*). 1921. May. No. 1070. [Summarized in *Japan Med. World.* Tokyo. 1921. Sept. 15. Vol. 1. No. 5. pp. 16–17.]

By repeated feeding of encysted cercariae of *P. westermanii* to dogs already infested with adult flukes, the number of flukes developing

from the fed larvae became smaller and smaller. The puppies born of the infested mother-dog were fed with encysted cercariae and were found to be infested with the flukes, but these flukes did not reach the lung but were almost always found lying free in the body of the dogs. This fact appears to the author to indicate some immunological relation.

R. T. L.

MURASHIMA (Tanehide). [**On the Therapeutic Efficacy of Emetin Hydrochloricum against Pulmonary Distomiasis.**]—*Kenyokwai Zasshi* (*Jl. of Kenyo Med. Soc.*). 1922. May. No. 158. [Summarized in *Japan Med. World.* Tokyo. 1922. Oct. 15. Vol. 2, No. 10. p. 305.]

The intravenous injection of emetine hydrochloride in a case of pulmonary distomiasis resulted in the reduction of expectoration and the disappearance of haemoptysis. Changes in the eggs were noticeable.

R. T. L.

ANDO (Ryo). [**A Supplementary Notice on the Prevention and Elimination of Pulmonary Distomiasis.**]—*Nippon Biseibutsugakkwai Zasshi* (*Jl. Japan Microbiological Soc.*). 1921. Feb. Vol. 15. No. 2. [Summarized in *Japan Med. World.* Tokyo. 1921. June 20. Vol. 1. No. 2. p. 19.]

The destruction of the molluscan intermediary can be most effectively attained by the use of natural enemies, *i.e.*, by ducks and carp. The eggs of the parasite are destroyed by mixing the sputum with human urine and allowing the mixture to putrefy. At room temperature 2 per cent. ammonium bicarbonate will kill all the eggs in 20 days.

R. T. L.

PORTER (Annie) & PIRIE (J. H. Harvey). *Clonorchis sinensis,* **the Human Liver Fluke, found in a Chinaman in Johannesburg, with Notes on the Pathology of the Case.**—*Med. Jl. S. Africa.* 1922. July. Vol. 17. No. 12. pp. 240–244. With 2 text figs.

A detailed description of the parasite, which does not seem to have presented any unusual characters, together with its life-history, forms the first half of this paper.

The pathology of the case is fully described. The liver was greatly enlarged and the right lobe contained a huge mass of faint yellowish, nearly spherical, new growth ; other nodules were distributed throughout the liver. The rest of the organ had the appearance of Laennec's cirrhosis, with the fibrous bands poorly developed ; and in some ways it resembled Hanot's cirrhosis. A comparison is made with five cases described by MEBIUS. In this case dilation and fibrosis of the ducts were absent, but in MEBIUS's case many more parasites were found in this location, which may account for this. The growths were malignant adenoma, and it is suggested that the toxic effect of the worms produces cirrhosis, an attempted regeneration of liver tissue results in over-compensation and abnormality, and a carcinoma results, " although no very definite evidence of the regeneration of liver cells was actually observed in the sections made of this case."

R. T. L.

KOSAKA (Keiji). [**On the Prevalence of Liver Distomiasis in Gifu Prefecture.**]—*Aichi Igakkwai Zasshi* (*Jl. of Aichi Igakkwai Zasshi*). 1922. Mar. Vol. 29. No. 2. [Summarized in *Japan Med. World*. Tokyo. 1922. Aug. 15. Vol. 2. No. 8. pp. 243-244.

In the counties of Inaba, Motosu, Ampachi and Kaidzu, encysted larvae of *Clonorchis sinensis* were found in *Pseudorasbora parva*, and cercariae of the same species in *Bythinia striatula* var. *japonica*, and the conclusion is drawn that these localities are infested with *C. sinensis*.

R. T. L.

MUTO (S.) & KOSHIWO (S.). [**On the Distribution of** *Clonorchis sinensis* **in Miye Prefecture.**]—*Chuo Igakkwai Zasshi* (*Jl. of Central Med. Soc.*). 1921. Jan. Vol. 28. No. 1. [Summarized in *Japan Med. World*. Tokyo. 1921. May 15. Vol. 1. No. 1. p. 25.]

The authors collected specimens of *Bulinus* [? *Bythinia*] *striatulus japonicus* and of *Pseudorasbora parva* in the Miye Prefecture; all harboured the cercaria of *Clonorchis sinensis*. Experimental infestations of dogs, rabbits and guinea-pigs were successful.

R. T. L.

MUTO (Masatomo). **On the Duration of Life of** *Clonorchis sinensis* **infecting the Animal Body.**—*Japan Med. World*. Tokyo. 1922. Aug. 15. Vol. 2. No. 8. pp. 224–226.

After two years the parasites appear normal. Three dogs survived this period and in these the parasites all showed signs of senile decay. *Case* 1: 2 years, 8 months (after infection), the worms were small and thin and some were atrophied. *Case* 2: 3 years, 4 months, as Case 1, with more marked atrophy of generative organs. *Case* 3: 4 years, 1⅔ months after first infection, eggs were no longer found in the faeces but over 100 worms were found at the autopsy. Some were dead, and in others the viscera were so degenerate as to be scarcely visible. A few were in the same state as Cases 1 and 2; these may have been worms from the second infection 3 years, 6½ months before death.

This work shows that the duration of life of the worms infesting an animal at the same time varies, but that the majority show signs of degeneration after 2½ years and gradually die, passing out by the common bile duct into the intestine.

R. T. L.

MUKOYAMA (Takayuki). **Experimental Study on the Transmigration Route of the Liver Distome in the Body of the Final Host.**]—*Aichi Igakkwai Zasshi* (*Jl. of Aichi Med. Soc.*). 1922. Mar. Vol. 29. No. 2. [Summarized in *Japan Med. World*. Tokyo. 1922. Aug. 15. Vol. 2. No. 8. p. 243.]

Encysted larvae were fed to 58 rabbits, 3 dogs and 3 guinea-pigs, and after six hours, the minimum period which elapsed before examination, freed larvae were found in the bile duct and nowhere else. Hence it is concluded that the larvae are freed in the duodenum and migrate directly along the bile duct.

R. T. L.

TOIDE (Gumpei). [**On the Blood Feature in a Case having Infection from** *Opisthorchis sinensis.*]—*Okayama Igakkwai Zasshi* (*Jl. of Okayama Med. Soc.*). 1921. May. No. 376. [Summarized in *Japan Med. World.* Tokyo. 1921. Sept. 15. Vol. 1. No. 5. pp. 25–26.]

The bloods from 38 cases of *Clonorchis sinensis* were examined and it was found that :—

(*a*) Anaemia was rare and never severe ;
(*b*) Leucocytosis was absent and eosinophilia only present in 24·3 per cent. ;
(*c*) No pathological characters were observed in any of the blood cells.

Such changes as occurred were not related in severity to the number of eggs of the parasite, and no pathological changes were produced by the injection into rabbits of either emulsions of the worm or alcoholic extracts of patients' urine.

R. T. L.

GESTEIRA (Martagão). **Um caso de schistosomose com manifestacões cutaneas.** [A Case of Schistosomiasis with Cutaneous Manifestations.]—*Brasil Médico.* 1922. May 6. Year 36. Vol. 1. No. 18. pp. 230–233.

A detailed account is given of a boy, 10 years of age, with an irregular papular eruption, yellowish red in colour, suggestive of urticaria but unassociated with any itching. The lesions were limited to the limbs and almost exclusively to the flexor aspects of them. Some of the papules disappeared in three to four days; others persisted for several weeks. The Wassermann reaction was definitely positive and the diagnoses made were syphilis, leprosy, and morphoea in turn. Finally, recalling a previous patient, a child of 6 years, Professor Gesteira had the faeces examined and "abundant ova of schistosomes" were reported present. [The variety is not stated.] Treatment with tartar emetic intravenously led to the rapid disappearance both of the ova and the eruption after the fourth injection. Treatment, however, was continued till ten had been given. [Neither the size of the individual doses nor the total amount administered is mentioned.]

H. Harold Scott.

BUXTON (P. A.) & KRIKORIAN (K. S.). **On Schistosomiasis in Palestine.** —*Trans. Roy. Soc. Trop. Med. & Hyg.* 1922. June 22. Vol. 16. No. 3. pp. 162–166.

Urinary schistosomiasis occurs in a number of places around Jaffa. The disease was not observed, except as a rarity, until Dr. A. FELIX drew attention to its prevalence among Jewish schoolboys early in 1921. Of 318 boys attending school in Jaffa the authors found 20, *i.e.*, 6·25 per cent., infected ; 5 out of 32 boys at Sheikh Muwannes, 2 out of 40 at Sulameh, 1 amongst 55 at Richon le Zion, and 3 in 25 at Kefr Uria and Beit Jiz were positive. In several other villages in the Jaffa area no cases were seen. Haifa, Jericho, Khedera, and Akka proved free. Specimens of snails belonging to the species *Isodora* (*Bullinus*) *contorta* (64), *Melanopsis prerosa* (45), *Melania tuberculata* (31), *Theodoxis anatolica* (15), *Limnaea peregra* (2) were dissected.

In *B. contortus* only were schistosome cercariae discovered; 6 were positive out of 64. The mollusc does not appear to frequent the River Auja, but occurs in tanks, cisterns and marshes connected with it. Copper sulphate diluted to 1 per million in the hard waters of Jerusalem and Jaffa killed the bilharzia intermediaries in 72 hours, while 1 in 100,000 was effective in 48 hours.

R. T. L.

POMMÉ & SABAGH (Abdel-Kader). **Un cas de bilharziose vésicale à Damas traité par l'antimoine en injections intraveineuses.**—*Bull. Soc. Path. Exot.* 1922. Oct. 11. Vol. 15. No. 8. pp. 695–698.

The author records for the first time the occurrence of *S. haematobium* in the state of Damascus.

R. T. L.

BRUMPT (E.). **La Bilharziose au Maroc. Répartition du *Bullinus contortus* et du *Planorbis metidjensis*. Etude épidémiologique comparée du foyer tunisien de Gafsa et du foyer marocain de Marrakech.**—*Bull. Soc. Path. Exot.* 1922. July 12. Vol. 15. No. 7. pp. 632–641. With 2 text figs.

The habitat of *B. contortus* has been investigated in Morocco, without elucidating the factors governing the prevalence of this mollusc. Attention is drawn to the high percentage of endemic cases of bilharziasis among the Arab population in Gafsa (Tunis) where *B. contortus* is rare; and the low incidence in the population of Marrakech, where *B. contortus* is very common. It is suggested that whilst the former population is rural in its occupations, the latter is urban and so less exposed to infection; this applies particularly to the children who play in the oases and perform agricultural work at Gafsa.

R. T. L.

PIRIE (J. H. Harvey). **Hepatic Carcinoma in Natives and its Frequent Association with Schistosomiasis.**—*Med. Jl. S. Africa.* 1921. Dec. Vol. 17. No. 5. pp. 87–97. With 8 figs; and *S. African Med. Rec.* 1922. Jan. 14. Vol. 20. No. 1. pp. 2–8.

During the past nine years 36 unequivocal cases of primary liver carcinoma have been diagnosed by the staff of the South African Institute for Medical Research. This number is large, especially when the proportion to other forms of malignant disease amongst natives is considered. It is the commonest form of carcinoma met with in natives, whereas this constitutes in European statistics but an insignificant proportion.

Primary carcinoma of the liver in Europeans most commonly develops in a cirrhotic liver and in most of the African cases reviewed *in extenso* by the author cirrhosis was present. In ten of the 36 cases schistosomiasis was definitely established and, as this infection is known to induce hepatic cirrhosis, it is presumed that schistosomiasis plays an important part in the etiology of hepatic carcinoma in South Africa.

R. T. L.

KAZAMA (Y.). **[Intestinal Cancer and Parasites' Ova.]**—*Gann.* Tokyo. 1921. Aug. Vol. 15. No. 3. p. 22. [Summarized in *Jl. Amer. Med. Assoc.* 1921. Nov. 26. Vol. 77. No. 22. p. 1778.]

Intestinal cancer seems to be much more prevalent in the regions infested with *Schistosoma japonicum* than elsewhere. In his nine cases the author found old ova in the neoplasm, especially at the margin of the growth. The mechanical and toxic injuries from them may have set up the irritation inducing the malignant disease.

R. T. L.

DE JONG (D. A.). **Levertrematoden en kanker.** [Liver Trematodes and Cancer.]—*Tijdschr. v. Vergelijke Geneesk. enz.* [1921.] Vol. 6. No. 4. pp. 1–27. With 19 text figs. [French and English Summaries, pp. 25–26.]

The author gives the following summary of his conclusions :—

"In the cases of invasion of the liver of man and different animals by Distomidae a peculiar glandular hyperplasy of the epithelium of the bile-ducts, often atypical, is characteristic, but the hyperplasy has not the signification of a malignant tumour. Certainly, notwithstanding the sometimes serious histological aspect, the character of the neoformation is benign with tendance to regression and recovery, if the Distomidae only disappear. And when they do not, and serious symptoms are the result, then those are not the consequence of cancerous alterations, but of others, localized or more generalized, which also are to attribute to the parasitism of the worms."

The paper is illustrated by 19 interesting microphotos.

R. T. L

JOSÉ QUINTINI (M.). **Algunas observaciones sobre la Bilharziosis y su tratamiento.** [On Schistosomiasis and its Treatment.]—*Gac. Méd. de Caracas.* 1921. Mar. 15. Vol. 28. No. 5. pp. 56–59. With 2 charts.

Nine cases of infection with *Schistosoma mansoni* were treated with injections of tartar emetic, beginning as a rule with 2 cgm. and increasing by 2 cgm. at each subsequent injection. In seven of the nine patients the ova were not found again while under observation. Another left hospital greatly improved, but at the last examination of the faeces one ovum was seen ; the remaining patient, in spite of daily injections of the drug, died unrelieved six days after entering the hospital. The maximum dose given to any patient was 15 cgm., and the highest total amount 108 cgm.

Nausea, shivering, or a painful cough were not common, and diminished if a teaspoonful of syrup of codeine was given an hour before the injection.

H. Harold Scott.

CARRASQUILLO (H. F.). **Casos de Shistosomiasis mansoni y su tratamiento con tartaro emetico.**—*Bol. Asoc. Med. de Puerto Rico.* 1922. Feb. 28. Vol. 16. No. 135. pp. 15–17.

Bilharzia disease is confined to certain districts in Porto Rico and is often mistaken for dysentery. Heavy infection occurs in Utuado. Twelve cases have come under the author's observation.

Diagnosis in all cases was made by microscopical examination, with discovery of lateral-spined eggs. Tartar emetic was first administered by the author in 1920, in view of results obtained by CHRISTOPHERSON.

Only six received a complete series of injections. Reaction was manifested as *mareos* (sea-sickness), epigastric pain, oppressive sensation in chest, cough, vomiting, ache in bones, fever, and occasionally diarrhoea.

Of six cases treated five were cured, with complete disappearance of symptoms, no eggs being discovered in faeces on repeated examination.

R. T. L.

WILSON (H. F.). **Rectal Administration of Tartarated Antimony in Bilharziasis.**—*Brit. Med. Jl.* 1922. Jan. 28. pp. 137–138.

Four cases are quoted to show that intrarectal administrations of tartarated antimony are in no way inferior to intravenous injections in the treatment of bilharziasis. It economizes time and is free from all risk. Nausea and vomiting occur less frequently than when the drug is run into the general circulation. One of the cases received 35 grains in five days without showing any symptom of intolerance. The drug was given in one or two ounces of warm water per rectum through a funnel with a No. 12 rubber worm catheter attached.

R. T. L.

i. MAYER (Martin). **Zur Behandlung der Bilharzia-Krankheit mit Emetin.** [Emetine Treatment of Schistosomiasis.]—*Wien. klin. Wochenschr.* Year 35. No. 3. Jan. 18. 1922. p. 59.

ii. TSYKALAS. **Erwiderungen auf obige Bemerkingen des Prof. Martin Mayer.** [Reply to the Observations of Professor Mayer.]—*Ibid.* p. 60.

i. In reference to TSYKALAS' article [this *Bulletin*, Vol. 19, p. 214] Mayer claims priority in the use of emetine for this disease, saying that he recommended it and gave it subcutaneously in 1915. He declaims strongly against the description of treatment by antimony as "barbarous," stating that in his experience it is superior to emetine.

ii. Tsykalas states that TSAMIS of Alexandria treated cases with emetine in 1913 and that he himself gave it intravenously in 1914. In support of his statement that antimony treatment is "barbarous" he quotes a case in which he gave a total of 0·74 gm. of tartar emetic; "the patient died 11 days after the last injection, although he was cured of his bilharziasis." Moreover, only 60 per cent. of his cases were cured by antimony. Another advantage claimed is that if emetine is badly borne the effects are less severe and more easily controlled than those arising from the use of tartar emetic.

R. T. L.

LEBAS (Geraldine Z. L.). **Of the Nature of the Antigen in the Complement-Fixation Test for Bilharziosis.**—*Jl. Trop. Med. & Hyg.* 1922. Mar. 1. Vol. 25. No. 5. pp. 49–54.

The activity of the antigen obtained from bilharzia-infested molluscan livers is to be attributed to a substance of a protein class or to some

active principle associated with protein as yet unidentified and unclassified. It seems unlikely that it is lipoidal in character since it is not present in extracts of snails' liver dried with acetone, made with absolute alcohol. The substance is soluble in 50 per cent. alcohol diluted with physiological saline, and can be extracted from the residue of the livers after previous treatment with acetone and absolute alcohol.

R. T. L.

CAWSTON (F. G.). **The Experimental Infestation of Fresh-Water Snails, with Special Reference to the Bilharzia Parasite.**—Reprinted from *S. African Jl. of Sci.* 1922. June. Vol. 18. Nos. 3 & 4. pp. 396–399.

Thirty-three days after infection with miracidia of *S. haematobium* laboratory-reared *Physopsis africana*, measuring 10 mm., contained cercariae, while on the 35th day free-swimming cercariae were being discharged from Physopsis only 9 mm. long. Attempts made at the same time to infect *Limnaea natalensis* proved negative. In June of 1922 the author came across a boy who had acquired infection with *S. mansoni* from bathing in pools at Mayville and Sydenham, Natal.

R. T. L.

CAWSTON (F. G.). **Fresh-Water Snails responsible for the Spread of Bilharzia Disease in Portuguese East Africa.**—*Jl. Trop. Med. & Hyg.* 1922. Oct. 2. Vol. 25. No. 19. pp. 305–306. With 1 text fig.

Specimens of *Isidora* (*Physopsis*) *africana* (?) and *Planorbis pfeifferi* living in the pools in the Municipal Gardens of Lourenço Marques harbour bifid-tail cercariae of various kinds " some of which resembled *S. haematobium*." Bilharziasis is common in this region.

R. T. L.

FRANÇA (Carlos) & DE MELLO (Froilano). **Bilharziose em Portugal e na India.**—*Med. Contemporanea.* 1921. Aug. 28 & Sept. 4. Vol. 39. Nos. 35 & 36. pp. 273–275 ; 281–284.

An introductory letter from Dr. Carlos França states that 17 autochthonous cases of bilharziasis have been detected in the Portuguese province of Algarve and expresses the opinion that the mollusc which serves as a host to the Schistosoma in Portugal will prove to be *Planorbis corneus* var. *metidjensis*, Forbes. He states further that the miracidia show a marked attraction for this variety of *P. corneus* and that he has watched the penetration of the tissues of this mollusc by numerous miracidia. Experiments made with other Portuguese mollusca, Physas, Limnaea, etc., gave uniformly negative results.

In discussing the question of bilharziasis in Portuguese India (Goa) de Mello states that in 1912 troops recruited in Mozambique began to be sent to Goa and that he is convinced that it was then that bilharziasis was introduced into the colony. Its existence was not suspected until 1914, though an intense eosinophilia was observed in some of the troops. In 1914 a soldier recently arrived from Africa suffering from a pseudo-dysentery supposed to be tuberculous was reported by the laboratory to be a victim of bilharziasis. A coprological examination of the whole company was at once made and

24 out of 110 soldiers were found to be infected by *S. mansoni*. A fresh examination was made six months later and 48 men were found to be bearers of *S. mansoni*. There was no case of *S. haematobium* infection.

In British India, on the contrary, *S. haematobium* is the organism uniformly found. The responsibility attaching to Portuguese India under these circumstances is obvious.

The following conclusions have been reached by the author :—

1. Of the native women living with the African troops, some for a period of more than six years, not one was found infected by bilharzia, and, further, though *S. mansoni* was brought into Goa probably as long ago as 1912, and certainly as long ago as 1914, the parasite has attacked none of the native inhabitants.

2. No indigenous mollusca have been found infected.

3. Of 108 soldiers of the present African troops 59 were found infected by *S. mansoni* and 1 by *S. haematobium*.

4. It has not been found possible to infect experimentally any indigenous fresh-water mollusca.

It would appear therefore that although *S. mansoni* has been imported by troops from Africa, it cannot become endemic in Portuguese India.

F. S. Arnold.

LOPES (J. Bastos). **Um caso de bilharsiose em uma senhora que nunca sahiu do paiz.** [A Case of Bilharziasis in a Woman who had never been out of the Country (Portugal).]—*Med. Contemporanea.* 1921. Nov. 13. Vol. 39. No. 46. pp. 361–363.

An account of a woman of Algarve, Portugal, 46 years of age, who had never been out of the country, infected with urinary schistosomiasis. Treatment with tartar emetic intravenously gave good results. Twelve injections were given, amounting in all to 1·02 gm. of the drug, the course being spread over two months. The explanation put forward as to the origin of the disease is that the patient was accustomed to stand for hours at a time washing clothes in a tank in which were also washed the clothes from the Tavira Hospital nearby.

H. Harold Scott.

BETTENCOURT (A.), BORGES (I.) & DE SEABRA (A.). **La température de l'eau et la bilharziose à Tavira (Portugal).**—*C.R. Soc. Biol.* 1922. Feb. 11. Vol. 86. No. 6. pp. 330–331.

All verified cases of bilharziasis (47) were professional laundresses, or women and young girls who washed clothes frequently in the basin at Atalaia, in Tavira, with a single exception of a boy, aged 13 years, who bathed in this water. The women are in the habit of urinating into this water. They also occasionally use the washing place at Pelames ; but in the urine of women who habitually used this place no bilharzia ova were found. The water in both cases comes from sources at a temperature of 25·5° C., but the water in the brook at Pelames is cold and no *Planorbis corneus* was found, whereas the water used for washing at Atalaia has not lost its heat. The authors suggest that there is an intimate connexion between the development of *Schistosoma haematobium* and the temperature of the water ; and they cite similar observations made by CONNOR, in Tunis, in 1910.

R. T. L.

BETTENCOURT (A.) BORGES (I.). **Le** *Planorbis metidjensis*, **hôte intermédiaire du** *Schistosoma haematobium* **au Portugal. Confirmation expérimentale.**—*C.R. Soc. Biol.* 1922. Nov. 11. Vol. 87. No. 33. pp. 1039–1040; also *Arquivos do Inst. Bact. Camara Pestana.* 1922. Vol. 5. No. 2. pp. 133–135. With 2 text figs.

Mice and guinea-pigs were exposed to infection by cercariae from *Planorbis corneus* var. *metidjensis* collected at Tavira, in Portugal. Three of the mice died about three months after infection, and schistosome adults were found in the portal vein and its branches, whilst sections of the livers showed numerous eggs and some adults. The worms showed typical characters and measurements of *S. haematobium*. Two microphotographs of the ovulating female are given.

R. T. L.

BETTENCOURT (A.) & DA SILVA (E. Pereira). **Le système excréteur de la cercaire du** *Schistosomum haematobium.*—*C.R. Soc. Biol.* 1922. May 13. Vol. 86. No. 17. pp. 1050–1052. With 1 text fig.

The number and nature of the mucus glands and the arrangement of the excretory system form the essential characters upon which the cercariae of the various human schistosomes are classed. The authors figure and describe in detail the cercaria of *S. haematobium* as found in *Planorbis metidjensis* in Portugal. Save in slight differences the excretory apparatus corresponds with that of the cercaria of *S. japonicum*. Three pairs of glands with large acidophil granules in the cytoplasm occupy nearly the whole of the posterior portion of the body.

R. T. L.

LOPES (Bastos). **Um caso autochtono de bilharsiose em Portugal.** [An Indigenous Case of Infection with *Schistosoma haematobium* in Portugal.]—*Med. Contemporanea.* 1921. Nov. 20. Vol. 39. No. 47. p. 376.

States that the first case of this condition in Portugal, the discovery of which had been attributed to Dr. BORGES, had previously been seen and diagnosed by Lopes, and that the specimen containing the ova had been sent by the latter to Dr. BORGES, who had in turn asked the consent of Dr. Lopes before reporting the case. The writer wishes to put on record his claim to priority.

H. Harold Scott.

i. BRODEN (A.). **Un cas de bilharziose rectale chez l'Européen au Congo Belge.**—*Ann. Soc. Belge de Méd. Trop.* Brussels. 1921. May. Vol. 1. No. 2. pp. 171–173.

ii.——. **Un cas de bilharziose rectale chez un Européen au Congo Belge.**—*Ann. Soc. Belge de Méd. Trop.* Brussels. 1922. Vol. 2. No. 1. pp. 131–132.

i. The patient was a colonial agent resident in the Belgian Congo since 1906. One month after returning from leave in 1917 he had an attack diagnosed without bacteriological examination as dysentery which was treated with emetine; amoebae were afterwards found in the stool. The attack was slight and there was a return in 1920, and the same treatment eliminated the morbid symptoms. With these exceptions the man had good health throughout his term of

service. Later in the year he was examined and numerous ova of *S. mansoni* were found, but except for the loss of about 2½ stone, he was in good condition. Treatment with tartar emetic was carried out successfully by intravenous injection of 53 cgm. given in eight graded doses.

ii. This is the second case of rectal bilharziasis in an European in the Belgian Congo. A member of the colonial troops, he was stationed in E. Africa and Uele for two periods of 3½ years and a final period of 4½ years. He was rarely ill. In the first period he suffered for a few days from fairly severe enteritis, and at the end of the second term he was sent home on leave owing to "diarrhée sanguinolente." During the last term he was not indisposed. He was examined for other reasons, and it was found that his stools contained strongyloides larvae and numerous eggs of *Schistosoma mansoni;* so that the tolerance of the intestine extended over a period of at least five years. The author ends by stressing the insufficiency of a purely clinical examination of colonials.

R. T. L.

HOFFMANN (W. H.). **Zur Verbreitung der Bilharziosis in Westindien.** [The Distribution of Bilharziasis in the West Indies.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1922. Vol. 26. No. 9. pp. 270–271.

The author, after making repeated examinations, is unable to confirm the statement previously made that Cuba is one of the chief endemic centres of *S. mansoni.* Only two positive findings were obtained and both patients had come from Porto Rico where the infection is common. The absence of the disease is explained by the fact that *Planorbis guadelupensis* has not been shown to exist in Cuba.

R. T. L.

FÜLLEBORN (F.). **Über den Nachweis der** *Schistosomum mansoni*-**Eier im Stuhl.** [Detection of Ova of *Schistosoma mansoni* in Faeces.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1921. Vol. 25. No. 11. pp. 334–340.

The method described takes advantage of the effects of moisture, temperature and light on the escape of miracidia from the ova. The detail of the procedure is as follows :—A portion of the faeces the size of a hazel nut is carefully rubbed down by gradual addition of 2–3 per cent. NaCl solution (several smaller pieces taken from different parts of the stool are better). The containing glass is then filled up with the salt solution and the mixture allowed to settle for five minutes; the ova sink. The supernatant fluid is poured off, fresh solution added, and sedimentation again allowed to take place. This is repeated two or three times. The finer particles are thus removed and the deposit contains the ova and the larger fragments. Some of the deposit is taken "with not too fine a pipette" and examined in a fairly thick layer without a coverglass.

If, after the last decanting, one adds warm water to the washed mass (the temperature in the glass should be about 40° C.; this is obtained by adding the water at 45° or 50° C. to the sediment) and places it in a bright light—sunlight or that of an electric lamp—miracidia are seen to escape in large numbers and can be seen easily with a lens; a microscope is not necessary as a rule, unless one wishes

to look for dead ova, as when controlling the effects of treatment. Finding of the miracidia is facilitated by placing a slip of black paper round the glass to cut out the light from the side and then viewing the contents by a strong illumination from above.

R. T. L.

KHALIL (M.). **The Morphology of the Cercaria of** *Schistosomum mansoni* **from** *Planorbis boissyi* **of Egypt.**—*Proc. Roy. Soc. Med.* (Sect. of Trop. Dis. & Parasit.). 1922. Apr. Vol. 15. No. 6. pp. 27–34. With 2 text figs.

The author describes in detail the finer structures of the cercaria of *Schistosoma mansoni* and illustrates his paper with two lucid figures. [It is unfortunate that the second figure showing the number and arrangement of the periacetebular glands is wrongly stated in the legend to be *S. haematobium.*] The number of flame cells in this cercaria is constantly three pairs in the body and one pair in the tail. At the beginning and at the end of the "main excretory ducts" are cilia which in all probability were mistaken by previous workers for flame cells. Of the periacetebular glands Khalil finds five pairs only, and these have a similar number of ducts and terminal spines. They are arranged in two groups, two anterior granular large cells on either side and a posterior group of three pairs of smaller cells with finer granules.

R. T. L.

KAZAMA (Yoshiaki). [**An Experimental Study on the Per Os Infection by** *Schistosoma japonica.*]—*Hokuetsu Igakkwai Zasshi* (*Hokuetsu Med. Jl.*). 1922. Apr. Vol. 37. No. 2. [Summarized in *Japan Med. World.* Tokyo. 1922. Sept. 15. Vol. 2. No. 9. pp. 264-265.]

Negative results always followed repeated feeding of *S. japonicum* cercariae to a rabbit. The author concludes that these cercariae cannot penetrate the mucous membrane.

R. T. L.

CORT (William W.). **The Development of the Japanese Blood Fluke** *Schistosoma japonicum* **Katsurada, in its Final Host.**—*Amer. Jl. Hyg.* Baltimore. 1921. Jan. Vol. 1. No. 1. pp. 1–38. With 3 text figs. and 4 plates.

In the cercaria of *S. japonicum* adaptive characters for locomotion and penetration have kept in a very primitive condition the primordial characters of the adult. The theory that sex in the schistosomes is differentiated in the miracidium and that the resulting cercariae are all of the same sex is supported. The cercariae enter at any point on the wet skin, but most frequently through the hair follicles. Most of the cercariae after entering the skin invade the small bloodvessels and lymph spaces. By the 12th day the majority of young schistosomes have reached the bloodvessels of the liver where alone conditions are favourable to growth. At the earliest stage in the liver the sexes cannot be distinguished, but when between 0·3 mm. and 0·4 mm. in length the males show distinctly larger suckers and broader bodies than the females. Differentiation of the reproductive organs comes later, in the males over 2 mm. and in the females of 1·5 mm.

The paper gives a detailed account of the morphology of the various stages of growth and these are carefully illustrated.

R. T. L.

SUYEMORI (S.). **[Development in the Final Host of the Formosan *Schistosoma japonicum*.]**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. of Formosa.* 1922. Jan. No. 220. pp. 1–3. In Japanese, pp. 1–24. With 3 figs.

Using cercariae obtained from *Blanfordia formosana* procured from a district in Formosa infested with *S. japonicum*, rabbits were infected through the skin. The morphological changes during the subsequent development were studied at various later periods: (*a*) when both sexes were present in the same host; (*b*) when only one sex was present.

The very young female is well developed anteriorly, but after embracement by the male the whole of the anterior part gradually atrophies and the suckers become smaller. The posterior part meantime develops rapidly and in the full-sized female this is long and big. In the very young male the anterior part is similarly well developed and the oral sucker is at first larger than the ventral. Where only one sex results the worms are poorly developed, especially in the case of the female worms in which the posterior end remains primitive, only increasing a little in length. In some of the worms a well pronounced furrow runs from head to tail along the mid-ventral surface. Apparently the female requires some stimulus from the male, transmitted by embracement, for its full development.

R. T. L.

CHU (H. P.). **Schistosoma Infection of a Dog.**—*Nat. Med. Jl. China.* 1922. June. Vol. 8. No. 2. pp. 116–119.

From a detailed study of the pathological findings in a case of *S. japonicum* in a dog in Huchow, China, the author concludes that there must be some sort of toxic material elaborated by the worms which produce chronic, continuous and progressive disturbances. Tubercular-like structures in the liver, spleen and intestines represent the sphere of attraction of lymphocytes and endothelial cells by eggs acting either mechanically or chemically, or together. There were haemorrhages in the liver and intestines, which were probably due to rupture of capillaries resulting from a pressure of eggs in them.

R. T. L.

CHRISTOPHERSON (J. B.). **The Intravenous Injection of Antimony Tartrate in Japanese Bilharzia Disease.**—*Brit. Med. Jl.* 1921. Oct. 8. p. 551.

A rectal case of infection with *S. japonicum*, in which there was a positive Fairley reaction, was treated with tartar emetic, and after 21 gr. in all were administered there was a disappearance of the eggs and a negative complement deviation reaction.

R. T. L.

CAWSTON (F. G.). **Emetine in Japanese Bilharzia Disease.**—*Brit. Med. Jl.* 1921. Dec. 17. p. 1031.

A Japanese medical officer on a ship entering Durban informed the author that three cases of *S. japonicum* infection had been successfully treated with emetine injections, given in doses of from a half to one and a half grains on alternate days over a period of one month. The author adds that severe cardiac depression is likely to occur during the second or third week of treatment with this drug.

R. T. L.

MIYAGAWA (Yoneji). **Ueber die Veränderungen der Eier des *Schistosomum japonicum* unter den Einwirkungen verschiedner physikalischen und chemischen Agenzien und ueber einige prophylaktische Massregeln der Schistosomiasis.** [Changes in Eggs of *Schistosoma japonicum* under the Influence of Physical and Chemical Agents. Prophylactic Measures.]—*Mitt. a. d. Med. Fak. d. Kais. Univ. Tokyo.* 1916. Vol. 15. No. 3. pp. 453–474. With 1 plate. [Received July 26, 1921.]

The author gives a full description of the effects of certain physical and chemical agents on the eggs of *Schistosoma japonicum.* He shows that Schistosoma eggs and their intermediate host can be destroyed by putting crude calcium cyanamide, humus-carbolineum and lime in a certain concentration in infected fields and in infected streams.

R. T. L.

CRAMER (Alec). **Trois cas simultanés d'anémie pernicieuse bothriocéphalique chez trois soeurs.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1922. Nov. 16. Year 38. 3rd Ser. No. 31. pp. 1475–1477.

The three sisters were mentally deficient and had lived voluntarily for two years almost completely shut up in one room, living on preserved food under revolting sanitary conditions. In 1917 they had eaten undercooked pike for several meals and a few weeks later portions of tapeworm were passed. After twelve months, palor of the integuments was noticed, and at the time of admission in December, 1921, all three were delirious, extremely wasted, with oedematous ankles, and the skin and mucous membranes colourless. The subsequent history is as follows :—

——, aged 35. Died three days after admission. Examination of blood during death agony : haemoglobin 11 per cent., erythrocytes 1,700,000, colour index 0·32, leucocytes 3,600, neutrophiles 67 per cent., lymphocytes 32 per cent., large mononuclears 1 per cent., numerous nucleated reds, anisocytosis and poikilocytosis. Post-mortem : severe general anaemia, heart slightly hypertrophied with very marked fatty degeneration. Ecchymoses under the pericardium and the endocardium and in the oesophagus, deposition of haemosiderin in the liver and kidneys. Marrow the whole length of the femur was red. Three Bothriocephalus, several metres long, were found in the small intestine.

——, aged 38. Died six days after admission. Haemoglobin 25 per cent., erythrocytes 540,000, colour index 2·3, leucocytes 3,100. Administration of male fern caused expulsion of two Bothriocephalus, 2 m. and 2·5 m. long. Mesosystolic murmurs were heard. Spleen was percussible for three fingers' breadth. Post-mortem : severe anaemia of all organs ; cloudy swelling of the kidneys and enlargement of the tracheo-bronchial lymph glands.

——, aged 36. On admission, mesocardiac murmurs, spleen percussible for four fingers' breadth ; liver was not enlarged, but efficiency value was low. Blood : haemoglobin 25 per cent., erythrocytes 806,000, colour index 1·5, leucocytes 7,750, a few rare myelocytes, anisocytosis, poikilocytosis and polychromatophilia. A vermifuge did not expel any helminthes, but, on the contrary, the stools contained numbers of Bothriocephalus worms [*sic*]. There were multiple recent haemorrhages in the fundus oculi. Her state rapidly improved, and a month later the haemoglobin was 75 per cent., erythrocytes 3,968,000, colour index 0·96,

leucocytes 9,300. On discharge, 67 days after admission, she felt well; the integument and mucosae were the normal colour.

The author considers that these cases, in the light of the literature, support the view that bothriocephalous anaemia depends on individual idiosyncrasy and lowered resistance of the host, rather than on the condition of the worms or their number.

R. T. L.

CRAMER (Alec). **A propos de quatre cas d'anémie pernicieuse botriocéphalique.**—*Rev. Méd. de la Suisse Romande.* 1922. Nov. Vol. 42. No. 11. pp. 718–727.

The author reaffirms the theory that bothriocephalous anaemia is dependent upon some predisposing factor; in this case the environment and mode of life were calculated to lower the resistance to any strain placed on the organism.

New case, female, aged 39. Throughout her life she had been underfed and overworked. In June, 1921, she began to waste, and also to pass segments of tapeworm, in all estimated at 7 metres. In August she had anorexia, intestinal pains and muscular weakness. She was admitted on November 9. Her colouring was pale and she was weak and nervous. Her temperature was 38·8° C. and ranged from 37·2° to 39·5° until death. The abdomen was very tender but little swollen. The liver was diminished, but the spleen enlarged. There was a slight cardiac murmur, but no jugular murmur. The macular region of the right eye showed a considerable haemorrhage. The stools did not contain Bothriocephalus eggs, but after 4 gm. of male fern extract 1·5 m. of *D. latus* were passed.

Blood.—On admission: red cells 1,240,000, haemoglobin 35 per cent., colour index 1·4, white cells 2,720, polynuclears 52 per cent., lymphocytes 33 per cent., large mononuclears 14 per cent., transitionals 1 per cent.; no eosinophiles. There was anisocytosis and slight poikilocytosis. Five days after the vermifuge: red cells 1,110,000, haemoglobin 30 per cent., white cells 3,500. Three weeks after the vermifuge: red cells 1,286,000, haemoglobin 45 per cent., colour index 1·8, white cells 12,400.

She died on January 21. The autopsy showed, besides a marked anaemia, catarrh of the stomach and intestine, oedema of the meninges, recent mitral endocarditis and fatty degeneration of the myocardium, ulceration of the vagina and deposition of iron in the liver.

R. T. L.

YOSHIDA (Shiro). [**On the Morphology of the Adult Worm of** *Sparganum mansoni* **found in the Frog and other Animals.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1922. Mar. & Apr. Nos. 2271 & 2272. [Summarized in *Japan Med. World.* Tokyo. 1922. Oct. 15. Vol. 2. No. 10. p. 296.]

The larval Sparganum found in the human body and in frogs develops in cats and dogs into adults identical in morphology. Dogs and cats, as well as chickens and ducks, have been found harbouring the same parasites. Infection of man results from drinking water containing infected Cyclops, or from the eating of raw chicken.

R. T. L.

MUTO (Masatomo) & MIHARA (Yoshisuke). [**On the Origin of a Species of Cestode (the Adult Form of** *Sparganum mansoni*) **that prevails among the Cats in a Village in Okayama Prefecture.**]—*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1921. Mar. No. 2217. [Summarized in *Japan Med. World.* Tokyo. 1921. July 15. Vol. 1. No. 3. p. 28.]

A large percentage of the cats in a village in the Okayama Prefecture harbour an intestinal tapeworm identified as *Sparganum mansoni.* The frogs in the same village are heavily infested with this parasite. When specimens were fed to a dog, eggs were found within 10–11 days in the faeces. It is considered that the eating of frogs thus infested results in infection with *S. mansoni.* R. T. L.

FÜLLEBORN (F.). **Über** *Hymenolepis diminuta* (**Rud.**) **1819.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1922. Vol. 26. No. 7. pp. 193–202. With 1 plate and 6 text figs.

The case occurred in a boy, four years of age, of German birth, in German East Africa [and is wrongly described as the seventeenth recorded instance of infestation with *Hymenolepis diminuta* (see RILEY, this *Bulletin*)]. The average size of the ova was 63·8 by 60·3 microns, the extremes being 77 by 69 and 59 by 49, and that of the oncosphere in its envelope 32·8 by 30·6 microns.

A description is given of the arrangement of the hooklets prior to the escape of the oncosphere. Attempts were made to infect white mice, but the eggs passed unchanged through the intestine; the same occurred with the meal-worm (the larva of *Tenebrio molitor*), though JOYEAUX claims to have infected the imago. R. T. L.

RILEY (William A.) & SHANNON (W. R.). **The Rat Tapeworm,** *Hymenolepis diminuta,* **in Man.**—*Jl. Parasit.* 1922. Mar. Vol. 8. No. 3. pp.109–117.

A review of the instances of human infestation with *H. diminuta* shows that a total of 61 cases are now on record. Of these one has been contributed by the authors in the present paper, and three are annotated in an addendum. The geographical distribution of the known infections is as follows: Brazil, 19; United States, 16; India, 8; Italy, 7; Nicaragua, 3; and one each for Argentine, Belgium, Cuba, East Africa, Grenada, Martinique, Philippines, Japan. A useful bibliography is given, which includes several references overlooked by RANSOM (1904). R. T. L.

ALESSANDRI (Carlo). **Contributo alla diagnosi biologica della** *Taenia saginata* (**Nota preventiva**).—*Riv. Crit. di Clin. Med.* 1922. Oct. 5. Vol. 23. No. 28. pp. 325–329.

An intracutaneous and a subcutaneous reaction is given for the detection of patients harbouring this tapeworm. Three forms of antigen were prepared. The parasite, after being washed in normal saline, was dried in a desiccator for three days and then triturated in a mortar. The first antigen was a saline extract; the second the alcohol insoluble portion; the third, the alcohol soluble fraction evaporated at 56° C. 0·5 cc. of a 1 in 10 dilution of an antigen is injected into one shoulder and an equal quantity of saline into the other.

In a positive case, in from 4 to 24 hours, there was a red, raised, infiltrated and painful zone, 3–4 cm. in diameter, around the site of

injection of the antigen, with swelling of the axillary glands and a slight elevation of temperature to 37·4° or 37·5° C. (99·3°–99·5° F.). The first antigen gave the best results, the second one less marked, the third none.

One patient infected with echinococcus and another with ankylostome yielded negative results with all three antigens, and patients with Taenia proved negative with echinococcus and ankylostome antigens.

H. Harold Scott.

ISOBÉ (M.). [**On the Resistance of the Egg of** *Taenia saginata* (?).]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. of Formosa*).—1922. May. No. 222. English Summary, pp. 2–3. [In Japanese, pp. 29–74.]

Embryos were still alive in eggs treated in the following ways :—

(*a*) Dry state at room temperature for thirty days ;
(*b*) 5 per cent. carbolic acid for one week ;
(*c*) 10 per cent. formalin for three weeks.

The author states that he has found a method, which is not described in the English summary, of liberating the embryos from the eggs.

R. T. L.

SAEKI (Yoshihisa). [**A Study on the Resistance of the Egg of** *Taenia nana*.]—*Jika Zasshi* (*Jl. Japan Soc. of Pediatrics*). 1921. May. No. 252. [Summarized in *Japan Med. World*. Tokyo. 1921. Oct. 15. Vol. 1. No. 6. pp. 16–17.]

Treating batches of eggs it was found that some survived :—

(*a*)	HCl	in 5 per cent. sol. for 12 hours ; 10 per cent. sol. for 6 hours.
	Acetic Acid	in 5 per cent. sol. for 12 hours ; 10 per cent sol. for 6 hours (few for 12 hours).
	Nitric Acid	in 5 per cent. sol. for 12 hours ; 10 per cent. sol. for 6 hours.
	Sulphuric Acid ..	in 10 per cent. sol. for 6 hours.
	Boric Acid	in 3 per cent. sol. for 24 hours.
	Phenol	in 5 per cent. sol. for 6 hours (few for 12 hours).
	Cresol Soap	in 5 per cent. sol. for 12 hours ; 10 per cent. sol. for 6 hours.
	Caustic Soda	in 5 per cent. sol. for 12 hours ; 10 per cent. sol. for 6 hours.
(*b*)	Alcohol	in 80 per cent. sol. for 24 hours.
	Formalin	in 10 per cent. sol. for 12 hours.
(*c*)	Sodium Chloride ..	in 20 per cent. sol. for one week.
	Soya Sauce (Sodium Chloride)	in 15 per cent. sol. for 5 days.
	Saturated Chalk ..	for 24 hours.
	Calcium Chloride ..	in 5 per cent. sol. for 12 hours.
	Calcium Permanganate	in 0·5 per cent. sol. for 12 hours.
	Sublimate	in 0·1 per cent. sol. for 1 hour (many survived).
(*d*)	Water :—3·0 to 3·0° C.	35 days (all died after 40 days).
	summer heat	died very soon (water stagnates).
	40° C.	half an hour.
	50–55° C. ..	3 minutes.
	60–65° C. ..	1 minute (all died after 3 minutes).

R. T. L.

ISAACS (Raphael). **An Injection Method for Aiding in the Identification of Tapeworm Species.**—*Jl. Lab. & Clin. Med.* 1922. Aug. Vol. 7. No. 11. pp. 691–692. With 2 text figs.

Pretty and useful microscopical preparations can be made by injecting with India ink through a hypodermic syringe fitted with a fine needle. The injection enables one to differentiate readily *T. saginata* and *T. solium.* By fixing in 10 per cent. formaldehyde, then dehydrating, clearing in xylol and mounting in canada balsam, permanent mounts may be made.

R. T. L.

i. DÉVÉ (F.). **L'échinococcose encéphalique expérimentale envisagée comme type de tumeur intra-cranienne expérimentale.**—*C.R. Soc. Biol.* 1921. Apr. 23. Vol. 84. No. 14. pp. 711–713.

ii. ——. **Echinococcose cérébrale intra-ventriculaire expérimentale.** *Ibid.* 1922. May 27. Vol. 86. No. 19. pp. 1120–1121.

iii. ——. **Echinococcose cérébelleuse expérimentale.**—*Ibid.* June 10. Vol. 87. No. 21. pp. 54–56.

i. By two experimental inoculations of hydatid fluid in rabbits, the author demonstrated the value of this as a procedure for the experimental study of cerebral tumours, the symptoms of cerebral hypertension, and other problems of the pathology of the nervous system.

ii. The author had previously stated (*C.R. Soc. Biol.*, April 23, 1921, see above) that direct inoculation of hydatid sand into the cerebral tissue caused a localized infection only, and was valuable for the study of sterile tumours. He now modifies this, having found that multiple infection of the brain may result by this method, cysts being found also in the cavities of the brain, in the cerebral fissures and in the great transverse fissure. The spread of infection was attributed both to the passive migration of scolices in the cerebrospinal fluid in the sub-arachnoid space and also to their active migration. A further note on this latter method is promised.

iii. An account is given of the inoculation, under aseptic conditions, of hydatid sand into the cerebellum of two rabbits. In both cases, two days after inoculation, unstable equilibrium, torpor, and loss of appetite came on, but disappeared in a few days, and the animals remained normal to within a few days of their death, after 136 and 164 days respectively. The symptoms then returned, rotation of the head to the left side, torpor, loss of equilibrium, refusal of food and rapid loss of weight were amongst the more important. Rabbit A, killed after 136 days, showed a cyst in the hypophysical region adherent to the sella turcica, as well as complete destruction of the anterior part of the left hemisphere and the vermis of the cerebellum. Rabbit B had the whole of the anterior part of the cerebellum destroyed by cysts, but none were found in any other part of the brain or cord.

R. T. L.

DÉVÉ (F.) & BILLIARD (A.). **Sable hydatique et radiothérapie.**—*C.R. Soc. Biol.* 1922. June 17. Vol. 87. No. 22. pp. 127–128.

Hydatid sand was exposed to X-rays of different strengths for varying periods, and then inoculated subcutaneously into rabbits. Their viability appeared to be unaltered. The authors propose carrying out experiments to determine the resistance of germinative membrane of the cyst to X-rays.

R. T. L.

DÉVÉ (F). & PAYENNEVILLE (J.). **Echinococcose et arsénobenzènes.**—*C.R. Soc. Biol.* 1922. June 17. Vol. 87. No. 22. pp. 129–130.

A rabbit was inoculated subcutaneously with hydatid sand and then given enormous and repeated doses of novarsenobenzol (neosalvarsan, "Erhlich 914"). On removing a portion of the tumour some months later active multiplication of vesicles was found to be going on, surrounded by a caseous encysted substance in the subcutaneous tissue. The authors are entirely at variance, by reason of this result, with ROUX and KOLBÉ, who claimed that a massive necrosis of hepatic hydatid cysts had been obtained with a single dose in two human cases. They even suggest that the arsenic may have stimulated multiplication.

R. T. L.

BREMER (K.). **Hydatid Disease.**—*S. African Med. Rec.* 1921. May 14. Vol. 19. No. 9. pp. 165–167.

Clinical notes are given of eleven cases of hydatid cyst which presented unusual features and came under the author's observation during eight years' practice in the Karroo districts of Cradock and Graaff-Reinet, South Africa.

No. 1 was an European boy, 12 years old, admitted with a temperature of 102°, looking ill and complaining of cough. The liver extended 1½ in. below the costal margin, but no definite tumour could be felt. In hospital he commenced to cough up frothy fluid and was in great pain. Under an anaesthetic a hydatid cyst was incised and the septic endocyst, vile-smelling and green-coloured, was removed after evacuation of the fluid contents. No. 2, a young woman aged 24, complained of pain after food and occasional vomiting. She was emaciated, a semi-invalid, and supposed to have a gastric ulcer. A distinct rounded mass could be felt on the under surface of the liver, which proved at subsequent operation to be a hydatid. No. 3 had multiple tumours of the liver, causing distress in breathing. Much bile-stained fluid poured from the operation wound for a week after the hydatid cyst was drained. No. 4, aged 28, was taken ill suddenly with pain in chest and difficult breathing. The left side was dull to percussion and breath sounds absent. His temperature was 103°. Clear transparent fluid was drawn off, but the diagnosis of pleural effusion following pleurisy was incorrect, for the man died later of hydatid of the lung.

R. T. L.

BERGÉ (André), BÉNARD (Réné), GUTTMANN (R. A.) & ROBERTI (J.). **Crise hémoclasique hydatique développée à la suite d'une ponction évacuatrice d'un kyste du foie.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1921. Feb. 25. 3 sér. 37e. Année. Vol. 45. No. 6. pp. 184–191. With 1 chart in text.

The authors maintain that superficial hydatid cysts can be treated by puncturing with less danger than by excision. In this case puncture was followed by slight toxic effects, rise of temperature and rapid heart beat; but in two days equilibrium was re-established.

R. T. L.

FAIRLEY (N. Hamilton). **A Note on the Failure of Tartar Emetic in the Treatment of Two Cases of Hydatid Disease.**—*Med. Jl. Australia.* 1922. Jan. 28. 9th Year. Vol. 1. No. 4. pp. 94–96.

Two cases of suspected hydatid cyst, both of whom had previously had hydatid cysts removed and gave strongly positive Casoni's reaction

and complement fixation with hydatid antigen, were subjected to a full course of intravenous injections of tartar emetic. The reaction remained unchanged in both cases. One case was then operated on and a living cyst containing three daughter cysts removed, and the reaction of the serum disappeared in nine months, though Casoni's reaction remained positive. No trace of antimony was found in the endocyst or daughter cysts. The other case was not operated on, and still gave a positive complement fixation reaction after fifteen months.

R. T. L.

LACHAUME & TOURNIER. **Sur un cas de kyste hydatique intra et extra-cranien constaté, après mort subite, chez un tirailleur Sénégalais.**—*Ann. de Méd. et Pharm. Colon.* Paris. 1920. (Numéro exceptionnel.) pp. 77–79.

The paper records the occurrence in a Senegalese soldier of an intra-cranial hydatid cyst, about the size of a large apple. This had perforated the skull in six places and penetrated outwards into and below the temporal muscle.

R. T. L.

DÉVÉ (F.). **Il n'existe pas de kystes hydatiques primitifs de la vésicule biliaire.**—*C.R. Soc. Biol.* 1921. Oct. 15. Vol. 85. No. 28. pp. 632–634.

After carefully examining the evidence in favour of the existence of hydatid cysts in the gall bladder the author concludes that these cysts never occur primarily in this organ. In some of the cases observed at operation the cyst was found to open into the gall bladder, in others there was probably a secondary invasion of the gall bladder by cysts which reached it along one of the large bile ducts. Therapeutically these observations are important, for if the opposite view is held an operator might restrict himself simply to performing cholecystectomy, and in so doing might overlook hydatid cysts deeply buried in the liver tissue.

R. T. L.

DÉVÉ (F.). **Echinococcose cérébrale intraventriculaire.**—*C.R. Soc. Biol.* 1922. May 20. Vol. 86. No. 18. pp. 1062–1064.

A boy, aged eight, showed typical signs of cerebral tumour. A lumbar puncture revealed great hypertension of the cerebro-spinal fluid, but did not relieve the symptoms, and he died four days later. The disease began to show 7–8 months previously. The autopsy showed a large number of cysts in the cerebral vesicle but no mother cyst. A solitary cyst undergoing caseous involution was found on the under surface of the liver.

R. T. L.

NEVEU-LEMAIRE (M.). **L'infestation par la voie cutanée de divers Nématodes parasites de l'homme et des animaux.**—*Bull. Acad. Méd.* 1922. June 30. 3rd Ser. Vol. 87. No. 25. pp. 697–699.

An historical summary on this subject is followed by a suggestion that dermatitis of helminthic origin in man may be occasioned by nematode larvae of worms which attain the adult stage in certain other animals, but perish a few days after entering through the skin of the human host. Conversely, larvae of nematodes parasitic in man will pierce the skin of animals, but likewise perish before reaching the adult stage in these experimental abnormal hosts.

R. T. L.

ALBISTON (Harold E.). **Nematodes in Pigs.** [Correspondence.]—*Med. Jl. Australia.* 1922. Aug. 5. 9th Year. Vol. 2. No. 6. p. 173.

The nematodes from semi-domesticated pigs in Queensland, reported by LEGG and RHEUBEN (1921), and identified by Dr. SWEET as *Ancylostoma duodenale* [this *Bulletin*, Vol. 19, p. 258], have been examined by Dr. DARLING, and of the five specimens, three have proved to be *Necator americanus* and two *Ancylostoma duodenale.* R. T. L.

i. WATANABE (Koh). [**On Two Human Cases of Rhabditis Infection.**]—*Nihon Shyokakibyo Gakkwai Zasshi* (*Japan Jl. of Gastro-Enterology*). 1922. Mar. Vol. 21. No. 2. [Summarized in *Japan Med. World.* Tokyo. 1922. Sept. 15. Vol. 2. No. 9. p. 261]

ii. TORII (Kuniyasu) & WATANABE (Hiroshi). [**On Rhabditis occurring in the Human Feces.**]—*Iji Shimbun.* (*Med. News*). 1921. Feb. No. 1613. [Summarized in *Japan Med. World.* Tokyo. 1921. June 20. Vol. 1. No. 2. p. 23.]

i. The English summary of this paper states that the author identified the parasite found in one of his two cases as *Rhabditis faecalis* n. sp. [No description of the species is given.]

ii. Rhabditis is of no clinical importance, but may cause confusion in diagnosis, since the eggs are often mistaken for those of *Strongyloides intestinalis.* All the authors' cases coincided with hookworm infection.

R. T. L.

ROUSSEAU (L.). **Notes relatives à** *Strongyloides intestinalis.* **Caractères et Biologie de ses larves strongyloides.**—*Bull. Soc. Path. Exot.* 1921. Apr. 13. Vol. 14. No. 4. pp. 214–219.

The author describes the best method for observing and keeping the larvae of ankylostomes and *Strongyloides intestinalis* and notes their differences.

In one case in cultures of anguillulines he saw rhabditis forms evolve into strongyloid forms after 35, 33 and even 30 hours, without passing through the intermediate sexual stage. Strongyloid larvae produced after the sexual stage never appear at the earliest until the fourth day, whereas ankylostome larvae never reach the strongyloid stage until the fifth day. Development may be suppressed by certain conditions, *i.e.* in faecal material which is too strongly acid embryos will die before escaping from the eggs. A certain degree of acidity, whilst arresting the development of ankylostome eggs, allows the anguilluline larva to live and develop. Very slight acidity seems to be favourable to strongyloid anguillulines, causing them to be developed direct from the rhabditis forms. The author's experiments cause him to hold the view that there are two normal methods of development : (1) direct from rhabditis to strongyloid forms ; (2) indirect, in which a sexual stage intervenes ; the latter being the slightly more frequent of the two. He concludes that the direct method is normal and intrinsic, and in no way due to the composition of the surrounding medium.

R. T. L.

FORNARA (Piero). **Un caso di ematuria da strongiloide intestinale.** [A Case of Haematuria due to *Strongyloides intestinalis.*]—*Policlinico.* Sez. Prat. 1923. Jan. 15. Vol. 30. No. 3. pp. 75–80.

A woman, a native of Novara, 49 years of age, in excellent health, was suddenly seized with left renal colic. The urine subsequently

passed was brownish-red, albuminous (1·5 per cent. by Esbach's instrument), with a considerable quantity of blood and numerous filariform larvae of *Strongyloides intestinalis*. Rhabditiform larvae were found in the stools 19 days later; they had been looked for during the interval, but without success.

The author thinks that the larvae passed via the lungs to the left side of the heart, thence to the systemic vessels and to the kidney.

H. Harold Scott.

DUNDERDALE (G.). **Notes on the Incidence of Filarial Infection in the Neighbourhood of Lamu, British East Africa.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1921. Nov. 17 and Dec. 15. Vol. 15. Nos. 5 and 6. pp 190–197. With 1 map.

Statistics for 1911–12 showed a very marked difference—14 out oi 28 and 1 out of 23 cases examined—of infection with filaria in Siyu and Faza respectively, villages a few miles apart on Patta Island. The author tried to find a reason for this, but his own results showed in Siyu 36 out of 82, and in Faza 10 out of 27 persons examined harboured filaria. He found no tribal incidence, and suggests that sedentary workers were more prone to infection. [The number examined on all occasions seems to be too small to warrant comparison; for instance, Lamu, population 7,000, examined 66.] The filaria embryos found were all diagnosed as *F. bancrofti*, and showed almost complete nocturnal periodicity. The mosquitoes found throughout the district are: *Culex fatigans, Stegomyia fasciata* and *Pyretophorus costalis*, and at Siyu, *Howardina pembaensis* is very common.

Elephantiasis of the legs and scrotum is common, as is filarial fever, lymphangitis and hydrocele. Lymphangiectasis occurs, but the author has seen no definite case of chyluria. The majority of infected persons appear to show no symptoms for at least a quarter of their life. No European and few Indians have suffered from elephantiasis.

R. T. L.

STEPHENS (J. W. W.). **Some Statistics of Filariasis.**—*Ann. Trop. Med. & Parasit.* 1921. Feb. 8. Vol. 14. No. 3. pp. 341–354.

The basis of this article is the material upon which MANSON-BAHR wrote his monograph on filariasis in Fiji and Ceylon. The conclusions of the author are that while the microfilaria rate in Fiji is higher than in Ceylon, and the rates for enlarged glands, hydrocele and abscess are also higher, yet there is no evident correlation. The elephantiasis rates are the same, although the microfilaria rate in Fiji is more than eight times as great as in Ceylon. Microfilaria is commoner amongst those with, than among those without, signs of filarial disease. Signs of filarial disease are commoner among those infected with than among those without microfilaria. A series of eleven tables accompanies the text.

R. T. L.

ROY (S. K.) & BOSE (S. C.). **Filariasis at Puri.**—*Indian Med. Gaz.* 1922. Aug. Vol. 57. No. 8. pp. 281–286. With 1 plate.

Out of 571 unselected persons examined in Puri jail and Sadar hospital during a period of two years, about 27·3 per cent. harboured microfilariae in their blood, and about 28 per cent. exhibited the clinical

manifestations of filariasis. Those examined were mostly adult males. Only 22·6 per cent. of cases showing typical lymphangitis and fever show microfilariae. Two cases only of chyluria were seen, and both showed microfilariae in the peripheral blood. Microfilariae occurred in 29 per cent. of healthy men, while in elephantiasis cases they were seen in only 12·9 per cent. Enlargement of the leg constituted 75 per cent. and of the scrotum 10 per cent. of the cases of elephantiasis at Puri. Seventeen cases of filarial abscesses were treated, and 15 of these gave a history of fever and lymphangitis, while six had embryos in the blood.

Ninety per cent. of the mosquitoes in Puri are *Culex fatigans*, and 34 per cent. of the mosquitoes in the town are infected with microfilariae. With the sudden advent of cold weather the embryos in the mosquitoes became sluggish or died. A single infected person entering a ward infected 33·1 per cent. of the mosquitoes there. The authors describe the microfilaria and its development in the mosquito in considerable detail. They find that 18 to 20 days are taken to complete the stages of development.

For treatment, antimony compounds are favoured. Sodium antimony thioglycollate was very efficacious in extirpating the microfilariae. Injections of sodium antimony tartrate 2 to 5 cc. daily diminished considerably the girth of elephantoid limbs. The treatment is especially efficacious in the stage of lymphatic oedema and when fibrosis has just commenced, so that the part still pits on pressure. Improvement has occurred in each of 50 cases treated. Cases of lymphangitis and fever were much benefited.

R. T. L.

Das (P. N.). **A Preliminary Note on an Investigation into Filariasis.**—*Indian Jl. Med. Res.* (Spec. Indian Sci. Congress Number, 1920). pp. 44–54.

A small number of cases of filariasis were treated by intravenous injection of doses of 2–5 cc. of a 2 per cent. solution of sodium antimony tartrate. Generally it was found that after about 26 injections the filariae disappeared from, or were much diminished in number in, the peripheral blood ; in a few cases the initial decrease was followed by a great temporary increase of embryo filariae. Four cases of lymphangitis were treated, acute attacks disappeared and some diminution of the swellings was noticed. Two cases of periodic filarial fever appeared to benefit by this treatment. Three cases of suppurating filarial abscess were examined ; no filariae were found, but they were found in a man having scars of old filarial abscesses.

R. T. L.

Maxwell (J. Preston). **Filariasis in China.**—*Philippine Jl. Sci.* 1921. Sept. Vol. 19. No. 3. pp. 257–327. With 24 plates, 1 map and 4 charts.

Filariasis plays a large part in diminishing the working capacity of a considerable number of manual workers in China. *Filaria bancrofti* is the only species of filaria found. *Culex fatigans* and *C. pipiens* are both of common occurrence. The distribution is somewhat peculiar. The infection does not spread north of the Yangtse Valley. It diminishes in frequency also as one ascends the river. From the mouth of the Yangtse to the Tonquin border, the disease occurs in a coastal

belt of some 15 to 25 miles broad, but inland the infection is lost save for small patches on the upper reaches of a river. Kiangsi is entirely free, and save on the coast Fukien is uninfected. From hospital statistics the general population would appear to have a 24·8 per cent. infection rate. There is a somewhat discursive description of the various clinical manifestations of filariasis, in which the author embodies much text-book material, thus overwhelming his many interesting personal observations. Filarial haemoptysis is mentioned, but it is not possible in China to exclude tuberculosis [and, it may be added, probably paragonimiasis]. Lymphatic varix is occasionally met with in the cutaneous form. Deep-seated varices are rarely seen, but varix of the spermatic cord is encountered during operations for hernia. Three varieties—spontaneous, inflammatory and operative—of lymphatic fistula are illustrated by cases. Varicose groin glands should be left alone, as septic lymphangitis may supervene; operation and removal may precipitate an attack of chyluria or of elephantiasis of the leg. One case of varicose axillary glands is mentioned. Lymphscrotum of all varieties occurs in China. Chyluria is by no means common, while chylous dropsy of the peritoneum and chylous diarrhoea are very rare. Elephantiasis is discussed in detail, and the paper concludes with some observations on the effect of filarial infection on the course of other diseases. In pneumonia and in nephritis filarial infection is thought to have an unfavourable influence.

R. T. L.

KAWAKAMI (Zen). **The Report on the Filariasis.**—*Japan Med. World.* Tokyo. 1922. Sept. 15. Vol. 2. No. 9. pp. 251–254.

There is a rapid increase in the age incidence of infection with *F. bancrofti* between 13 and 17 years, the age at which both sexes start agricultural labour. The first attack of filarial fever is generally between the third and fourth decade, localized erysipeloid areas of skin appear in the attacks, and these very often gradually pass over into elephantiasis. The inflammatory areas in certain sites are more prone to undergo this change. In the lower extremities, elephantoid change always begins on the anterior surface of the leg. The author recommends the study of the distribution of the patients in endemic areas and, supporting the water-borne theory of filariasis, he considers that metamorphoses are undergone in mosquitoes and other insects and that the metamorphosed larvae escape into water and enter through the skin of host under "yet unknown conditions." He cites a case of a child having filarial fever at the age of two months. The mother says that erysipeloid areas on the lower extremities have gradually spread; they are ten years later typically elephantoid.

A preliminary report is given of the pathology of *F. immitis* in the dog. Larvae were found in greatest numbers in the lung, the myocardium, respiratory muscles and liver, and the author considers that they are enticed there by the active and periodical movement of these organs. Escape of larvae from the host is considered the cause of elephantiasis, and of death in dogs having pneumonia and diarrhoea, as larvae were found in the affected areas in great numbers. But larvae were not found on the altered areas of skin or in the sputum or faeces of living dogs. Filarial fever is attributed to the periodical accumulation of larvae in the blood.

R. T. L.

YAMADA (S.). **[Descriptions of Ten New Species of Aëdes found in Japan, with Notes on the Relationship between some of these Mosquitoes and the Larva of** *Filaria bancrofti*, **Cobbold.]**—*Annotationes Zoologicae Japonenses*, Tokyo. 1921. Oct. Vol. 10. No. 3. pp. 45–81. With 4 figs. [Summarized in *Rev. Applied Entom.* 1922. July. Vol. 10. Ser. B. Pt. 7. p. 147.]

Aëdes (*Culicelsa*) *togoi*, Theo., a common mosquito in Japan, proved to be able to serve as an intermediary for *Filaria bancrofti*, but similar experiments with *A. galloisi*, *A. chemulpoensis* and *A. esoensis* gave negative results.

R. T. L.

SUGANUMA (Seijiro). **Beiträge zur Kenntniss ueber die Periodizitäts- oder Turnusfrage der** *Filaria bancrofti* **(III. Mitteilung).** [Periodicity of *Filaria bancrofti*.]—*Mitt. d. Med. Gesellsch. z. Tokyo.* 1921. July. Vol. 35. No. 7. [In Japanese, pp. 1–61. German summary, pp. 1–8.]

After careful experiments the author concludes that the periodicity of nocturnal microfilariae is due to the following causes :—

1. The most important cause is their strong negative heliotropism.

2. Chemotropism of the microfilaria towards certain conditions of the blood may increase, or, by a partial heliotropic transformation, hinder the periodicity to a certain degree.

3. Meteorological changes may influence the time of the appearance or disappearance of microfilaria in the peripheral blood.

R. T. L.

MENDELSON (Ralph W.). **Elephantiasis of the Labium.** [Correspondence.] —*Brit. Med. Jl.* 1922. May 27. p. 839.

This case from Siam is reported because (*a*) in Siam elephantiasis of the labium is rare, though filariasis, including other elephantoid lesions, are common, and (*b*) microfilariae were found in the peripheral circulation "at all times."

R. T. L.

PLAYFAIR (Kenneth). **A Note on Dormant Filarial Infection.**—*Lancet.* 1922. Sept. 30. p. 709.

The patient in this case served in West Africa in 1917, and about that time had swellings in both wrists, arms, and above the left eye, which were attributed by a medical officer there to Filaria [*F. loa*]. When admitted to hospital in 1922, for shortness of breath following influenza four weeks previously, a blood count was made on account of the obvious anaemia. The red cells were 2,256,000 per cmm., the white cells 4,800, and the differential count gave polymorphonuclears 38 per cent., eosinophiles 45, lymphocytes 10, large mononuclears 6, basophiles 1 per cent. Microfilariae were found in the blood in the morning and in the evening. They were never numerous. No malarial parasites were found. There were no helminth ova in the faeces.

While in hospital on March 11th the patient awoke totally blind except for perception of bright light when flashed on to the retina. Both eyes were equally affected. The pupils reacted normally to light, and examination of the fundi revealed an acute retrobulbar neuritis. The vision began to return after 48 hours, and rapidly improved until it became normal again at the end of two weeks. There was no fever nor any increase in the microfilariae. The author assumes that the microfilariae lay dormant in the lung from 1917, until released into the general circulation by the attack of influenza. [The eosinophilia and transient ocular symptoms suggest rather the migration of an adult worm.]

R. T. L.

MONTPELLIER (J.) & LACROIX (A.). **Evolution de la gale filarienne (Onchocercose dermique).**—*Bruxelles-Médical.* 1921. Mar. 15. 1re année. No. 5. pp. 140–143. With 3 figs.

The study of 150 cases of filarial itch in Colonial troops shows that the disease takes the following course. First an intense itching of the affected area, with no visible macroscopic or microscopic lesions. A section of the skin taken at this time shows a vigorous invasion by microfilariae, while none were present a few days previously. The patient scratches violently, and in some cases produces urticaria, or transient itching papules. In a few days the itching subsides, the skin becomes normal and sections of it show no microfilariae. A few weeks or months later another attack occurs, and successive attacks produce finally permanent skin lesions. This stage is termed "la periode d'état"; there are diffuse lesions of tender roughened thickened skin, in places a dry papular eruption scattered over with papulo-vesicular pustules. Diagnosis at this stage is easy, and skin sections almost always show larvae, generally in large numbers, but they are not found in the heads of the papules; hence superficial scarification may not show any. This is attributable to their living outside the vessels in the surrounding tissues.

In the early stages diagnosis is not easy, but sections of the skin of patients having an onchocerca tumour should be carefully examined during the itching stage.

The absence of microfilariae in onchocerciasis is rare and is attributed to the presence of a female worm only. The varying degree of the affection is typical of prurigo, and is due to individual variations of susceptibility of the skin. The apparent absence of periodicity may be increased by the presence of several adults, which will necessarily produce an intermittent discharge of embryos. At any given moment a patient having adult *Onchocerca volvulus* may present no symptoms of filarial itch, but it is quite the exception, in the opinion of the authors, for this condition to be permanent.

R. T. L.

HUDELLET (G.). **Extirpation totale du ver de Guinée après diagnostic de position par les rayons X.**—*Bull. Soc. Méd.-Chirurg. Française de l'Ouest-Africain.* 1919. June. Vol. 1. No. 2. pp. 17–19.

X-ray location of young Guinea-worms is unsatisfactory, as their permeability to the rays is similar to that of the surrounding tissues. But the injection of 10 per cent. Collargol into the worm renders it opaque. A rather blunt needle is stuck into the worm and secured to

it by two or three turns of wire, 2 cc. of the solution are injected, and the needle is withdrawn, leaving the wire in place to indicate the site of the injection. An incision of 2–3 cm. is made at the highest point of the middle of the worm, which allows the worm to be seized, and it can be withdrawn, by gentle traction aided by kneading of the tissues, the metallic thread having been previously removed. The worm is easily withdrawn. Occasionally the injection does not penetrate to the end of the worm, and the incision may be consequently too near one end, in which case it is better to make the extraction in two sessions making a new injection and a new incision higher up. A case is reported of the removal of a Guinea-worm 45 cm. long in one operation from the malleolar region; the patient was able to leave the hospital a week later.

R. T. L.

RANSOM (B. H.). **Some Recent Additions to the Knowledge of Ascariasis.**—*Jl. Amer. Med. Assoc.* 1922. Sept. 30. Vol. 79. No. 14. pp. 1094–1097. With 1 text fig.

A review of the present knowledge of ascariasis is followed by a more detailed consideration of the relation of the ascariasis of the pig to the human infection. There probably exists a biological difference, but it is assumed [with probability] that the pig is of etiological significance in the spread of pulmonary ascariasis in man [*cf.* KOINO below].

R. T. L.

KOINO (S.). **Experimental Infections on Human Body with Ascarides.** —*Japan Med. World.* Tokyo. 1922. Nov. 15. Vol. 2. No. 11. pp. 317–320.

A healthy man, 21 years of age, and having no ascaris eggs in his faeces, was fed with 500 mature ascaris eggs from the pig. The temperature on the 3rd day was 37·4°, and from then until the 9th day 36·4°–37·5° C. On the 9th day there were rigors and the temperature rose to 39·1° and for three days was 37·3°–39·0°; on the 13th day it was 37°, and fell to normal on the 16th day. The cough and the watery mucous sputum increased gradually; no blood and no ascaris larvae were found. The subjective symptoms were pains and a heavy feeling over the front, sides and back of the chest, radiating to the apices. The respiration rose to 27–32, and was normal on the 13th day. The pulse rate increased slightly with the rise of temperature, but was otherwise normal. The second pulmonary arterial sound was slightly increased. On the evening of the 10th day there were dry rales and crepitations and occasional moist rales; these were succeeded by whistling rales; on 13th day they had disappeared from the front and by 15th day they were entirely absent, and by 17th day all symptoms had gone. There were no areas of dullness to percussion, the liver and spleen were not palpated, and there was no albumin in the urine. Fifty days after the test feed an anthelmintic was taken, but no ascarids were expelled.

The author then fed himself with 2,000 mature human ascaris eggs. On the 2nd day there was slight anorexia and headache. On the 3rd day the temperature rose to 37·2° and continued to rise. 6th day there were rigors, severe headache, increased pulse and respiration, and a frequent cough with abundant sputum. On 8th day the temperature was 39·8°, and was 38·7°–40·2° till 13th day after feeding (*i.e.*, to 7th day

of the pneumonia), when it began to fall by crisis, and was normal on the 15th day. Respiration increased to 11th day and 12th day, when it was 56–58 and the face was cyanosed; it began to fall with the temperature to 24, and a week later it was normal, but easily increased by slight exercise. The pulse increased with the temperature to 90–120, and was weak and thready at the height of the pneumonia. The cough increased with the rising temperature and was paroxysmal with interludes of 2–5 minutes, and subsided on 17th day. The volume of sputum increased with the rising temperature, and on 13th day was 155 cc. up to 7 p.m., and on the two succeeding days the serious state of the patient precluded its collection. Ascaris larvae, ecdysis was observed in a few, were found in the sputum from the 9th to 16th day. In the sputum of the 11th day 178 larvae were counted; on this and the succeeding day the sputum contained well-mixed blood. [Both these features were absent in the preceding experiment.] There was complete anorexia during the fever. Pain in the chest was almost absent except on the first day of the pneumonia. There were severe muscular pains in the back and lower extremities, and the olfactory nerves were very hypersensitive; only the smell of peppermint was tolerable.

Dry, moist or whistling rales were heard from 10th–15th day, but areas of dullness and tympanic areas were found from 9th day and increased to the crisis; by 15th day the breath sounds were normal. From 11th–13th day the apex beat was accentuated slightly and the second pulmonary arterial sound was "impure." The liver was palpable two fingers' breadth from 10th–16th day, and then gradually diminished in size and was hidden by 21st day. The spleen was not palpable throughout the disease. The urine was decreased, but no albumin was found. The patellar reflex was slightly accentuated. There was congestion of the cornea and throat. Fifty days after the test feed an anthelmintic was taken and 667 worms were expelled; these were all immature and from 3–8 cm. in length.

The conclusion is that whilst ascarids from the pig and man are morphologically similar, there is a biological strain of pig ascaris capable of causing pneumonia in man, but incapable of reaching the adult stage in this host.

R. T. L.

NETTESHEIM (Wilhelm). **Das Wandern der Spulwurmlarven in inneren Organen.** [Migrations of Ascaris Larvae in the Internal Organs.] —*Münch. Med. Wochenschr.* 1922. Sept. 8. Vol. 69. No. 36. pp. 1304–1306. With 5 text figs.

After their emergence from the ova Ascaris larvae may penetrate the intestinal mucous membrane and reach the liver viâ the portal vessels, giving rise to focal inflammation and small abscesses by boring out of the vessels into the liver tissue; thence they may reach the lungs by the inferior vena cava, and gain the alveoli, bronchi and trachea. The alveoli are congested and peribronchitis is set up, while adjacent parts of the lungs become emphysematous. Being swallowed in the sputum, they return to the intestine. They may pass from the lungs by the pulmonary veins to the systemic circulation and the viscera. From the intestine they may travel by the lymph route viâ the thoracic duct and so reach the lungs. The author could not confirm YOSHIDA's statement that they might penetrate from the abdominal cavity through the diaphragm to the lungs.

Since the larvae, which on emergence from the ova are 0·2 mm. in length, when found in the liver are only 0·4 mm., and in the spleen, kidneys, or abdominal cavity, 0·3 mm., whereas those in the lungs may be as long as 1·5 mm., the author is of opinion that passage through the lungs is necessary for the development of the larvae.

R. T. L.

ASADA (Junichi). [**Contributions to the Knowledge of the Developmental Cycle of Ascaris.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1922. May & June. Nos. 2278 & 2283. [Summarized in *Japan Med. World.* Tokyo. 1922. Nov. 15. Vol. 2. No. 11. p. 323.]

Ascaris eggs will survive at low temperatures for several months unless desiccated, or in too much water, or subjected to fermentation or putrefaction. Sometimes they remain infective for over a year. The period for the formation of the infective larva in the egg is one or more weeks. The egg does not hatch in gastric juice, nor is this essential to hatching, since eggs injected into the intestine hatch well, the site probably being the small intestine, whence the larvae pass into the body cavity, through the lungs, and back to the intestine. And in the mouse, guinea-pig and rat they are then soon expelled.

R. T. L.

USAMI (Kenichi) & KAMADA (Ryonosuke). [**Complement Fixation Test in Ascariasis.**]—*Chuo Igakkwai Zasshi* (*Jl. of Central Med. Soc.*). 1921. Mar. No. 155. [Summarized in *Japan Med. World.* Tokyo. 1921. July 15. Vol. 1. No. 3. p. 23.]

The body-cavity fluid of Ascaris used as an antigen gave positive results with cases of ascariasis and ankylostomiasis. A saline extract of the female worm proved best. The author states that the complement fixation in ascariasis is not specific.

R. T. L.

HAYASHI (Shinzo). [**Resistance of the Erythrocytes of the Patient of Ascariasis against some Hemolytic Substances, and on the Influence of the Patient's Serum of Ascariasis against these Substances.**]—*Iji-Shimbun* (*Med. News*). 1922. July. No. 1097. [Summarized in *Japan Med. World.* Tokyo. 1922. Nov. 15. Vol. 2. No. 11. p. 326.]

Red cells in ascariasis are less fragile in hypotonic saline and in saponin solutions, and are slightly more resistant to the "normal hemolytic complement" of the rabbit than cells of normal persons. On the other hand those from very anaemic cases of ascariasis are abnormally fragile in ammonia and phenol solutions, though stronger in caustic soda solution. The antihaemolytic effect of serum and plasma is unaltered for hypotonic saline and saponin solutions; but it is abnormally effective against haemolysis by ammonia, phenol or caustic soda solution. This antihaemolysin is thermostable, and it is concluded that it is not a fatty substance, since no increase of lipoid content can be demonstrated.

R. T. L.

SCHLOESSMANN. [**Severe Disturbances induced by Ascarids.**]—*Mitt. a. d. Grenzgeb. d. Med. u. Chir.* Jena. 1921. Vol. 34. No. 1. p. 1. [Summarized in *Jl. Amer. Med. Assoc.* 1921. Dec. 3. Vol. 77. No. 23. p. 1851.]

Surgical interference was necessary for a group of cases of spastic ileus due to ascarids, 0·05 gm. of santonin three times a day for six days having had no effect; the worms were removed alive. Their numbers varied from 1 to 489. Toxic effects, two rapidly fatal, were observable in three cases. It is suggested that the helminths become more toxic during their breeding periods. Ascarids necessitated operation on the biliary apparatus of five cases, and were found in the appendices of five children.

R. T. L.

LANCELIN (R.). **A propos d'un cas de méningite helminthique accompagné de modifications chimiques et cytologiques du liquide céphalo-rachidien.**—*Bull. et Mem. Soc. Méd. Hôpit. de Paris.* 1922. Oct. 26. 3rd Ser. Year 38. Vol. 46. No. 28. pp. 1369–1372.

A soldier, aged 20 years, had the clinical symptoms of tubercular meningitis; the attack lasted ten days, and terminated two days after the expulsion of 17 ascaris. The cerebro-spinal fluid was sterile, with an excess of albumin and of lymphocytes, but no turbidity. Wassermann test was negative and blood sterile. The author does not consider it was a post-infectious meningitis resulting from a slight attack of erysipelas a week or so before; nor was it a reflex pseudo-meningitis due to the worms, since the chemical and cytological changes are against this. He cites GUIART in favour of the toxic action of helminths, and he attributes the attack to toxins generated by the infesting ascarids.

R. T. L.

AIEVOLI (E.). **L'ascaridiasi in chirurgia.** [Surgical Conditions in Ascariasis.]—*Riforma Med.* 1922. Oct. 2. Vol. 38. No. 40. pp. 946–947.

Ascaris does not enter the papilla of Vater unless the canal has been previously dilated by passage of a calculus. It may set up cholangitis, cholecystitis, and hepatic abscess, the last more commonly in the left lobe. The worm may die and become calcified, or may disappear owing to the action of proteolytic and peptolytic ferments.

H. Harold Scott.

RAMSAY (G. C.). *Combretum pilosum* **Roxb., as an Anthelmintic for** *Ascaris lumbricoides.*—*Indian Med. Gaz.* 1922. Oct. Vol. 57. No. 10. pp. 374–375.

The Nagas eat, as a cure for worms, the fruit of the jungle shrub *Combretum pilosum*, which grows luxuriantly in the plains of Cachar, India; the young leaves also are often chopped up with flour and eaten as "worm cakes." The tea-garden coolies call the shrub *Bhooree Loth*, and the Bengali villagers name it *Jhoonia Loth*. In 1920, owing to the exorbitant cost of santonin, the author used decoctions of the leaves of this plant, and found it to be a specific for *Ascaris lumbricoides* and *Oxyuris vermicularis*; it seemed to have no effect on hookworms or

whipworms. The decoction is made from the powdered leaves, 2 oz. of which are boiled for twenty minutes in a pint of distilled water. This is the usual dose, but 4 oz. have been given without ill effect. Castor oil should be given on the previous evening, and also two hours after the administration of the decoction.

R. T. L.

NAKAJO (Suketoshi). [**On a Method of Complete Vermicidal Treatment of Ascaris, which has been deduced from the Extra-Intestinal Developmental Stages of the Larvae.**]—*Chugwai Iji-Shimpo* (*Internat. Med. News*). 1922. Mar. No. 1008. [Summarized in *Japan Med. World.* Tokyo. 1922. Aug. 15. Vol. 2. No. 8. p. 233.]

The author cured recurrent ascariasis in himself by the administration of santonin ten days after the faeces were free from eggs. Five repetitions secured freedom from the infection, which had persisted for many months.

R. T. L.

SCHMIDT (W. Th.). **Zur Therapie der Oxyuriasis.**—*Münch. Med. Wochenschr.* Mar. 17. 1922. Year 69. No. 11. pp. 400–401.

The author recommends the employment of aluminium subacetate as a powerful anthelmintic, harmless to the patient. The dosage is 1 gm. three times daily on three successive days for adolescents, 0·5 gm. for children, 0·5 gm. twice daily for infants. It is well to precede by a dose of calomel, "to stir up the parasites in the depth of the intestinal wall."

R. T. L.

FUCHS (Bertold). **Ueber eine Trichinenepidemie in Erlangen.** [An Epidemic of Trichiniasis in Erlangen.]—*Münch. Med. Woch.* 1922. Sept. 15. Vol. 69. No. 37. pp. 1336–1338. With 1 text fig,

An epidemic of trichiniasis occurred in Erlangen in March and April, 1922, involving some 100 persons. The disease was traced to the eating of infested pork. The early cases were diagnosed as influenza or rheumatism, but in most the symptoms were quite typical. A good picture is given showing the facial oedema and puffiness of the eyelids. Labial herpes was seen in two instances. The diazo reaction was very marked, as was also the eosinophilia, in one case as high as 78 per cent. There were no fatalities.

R. T. L.

IHLE (J. E. W.). **On** *Oesophagostomum apiostomum* **(Willach) and some Remarks on the Classification of the Strongylidae.**—*Bijdragen tot de Dierkunde uitgegeven d. h. Konin. Zoölog. Genootschap Natura Artis Magistra te Amsterdam.* 1922. Afl. xxii. p. 89–93. With 5 figs.

In a note on five specimens of *O. apiostomum* from the intestine of an orang-outang, Ihle states that this species is of common occurrence in the Philippines and has been found several times by WEINBERG in *Macacus cynomolgus* and *M. sinicus.* He agrees with the opinion of

RAILLIET and HENRY that the specimens found in man in Northern Nigeria and ascribed by LEIPER to *O. apiostomum* belong to an independent species, as LEIPER's specimens differ too much in shape and measurements of the mouth-capsule, the height of the mouth-collar and the length of the spicules. Moreover, *O. apiostomum* has been found only in Asiatic monkeys. The author makes a new sub-genus, *Conoweberia*, for the species *O. apiostomum* and *O. brumpti*, with the following characteristics based upon *O. apiostomum* as type :— "Cuticle of neck inflated between the mouth-collar and the cervical groove. Cervical papillae close behind the middle of the oesophagus. No lateral cuticular membranes. The mouth-capsule has the shape of a truncated cone. Oesophageal funnel with three teeth behind the mouth capsule. Vagina long, from the vulva directed to the front."

R. T. L.

CORT (W. W.), ACKERT (James E.), AUGUSTINE (Donald L.), PAYNE (Florence King) & PAYNE (George C.). **Investigations on the Control of Hookworm Disease.**—*Amer. Jl. Hyg.* 1921. Sept.–Nov. Vol. 1. Nos. 5–6. pp. 557–568; 1922. Jan. Vol. 2. No. 1. pp. 1–16. With 2 text figs.; pp. 17–25; pp. 26–38; pp. 39–50; Mar. Vol. 2. No. 2. pp. 107–148. With 3 charts, 10 figs. & 1 plan; pp. 149–161. With 1 chart & 4 figs.; pp. 162–171; pp. 172–176; pp. 177–187; May. Vol. 2. No. 3. pp. 254–263. With 3 plates.

I. General Introduction [CORT].

The purpose of the general introduction is to analyse the factors involved in hookworm control and to suggest certain lines which need further investigations. Very little precise information is available on the life of the hookworm in the soil, and its infectivity has seldom been scientifically studied. Unless the exact sources of infestation in a given area are known, only general control measures can be applied. The phases which need investigation in connection with soil problems are outlined thus :—

"Certain phases of an investigation of hookworm in the soil.

I. The eggs and young larvae.
  A. The distribution of the eggs over the soil.
    1. By man.
      (*a*) By direct soil pollution.
      (*b*) By accidental carriage on feet and hands.
      (*c*) By use of human excreta in fertilizing the soil.
    2. By animals other than man.
      (*a*) By feeding on human feces.
      (*b*) By human feces clinging to parts of the body.
    3. By physical agencies.
      (*a*) By rain.
      (*b*) By bodies of water.
  B. Conditions necessary for the development of the hookworm in the soil.
    1. Length of time under varying conditions that the hookworm eggs will remain alive without hatching in human stools.
      (*a*) In stools on the soil.
      (*b*) In stools in water.
      (*c*) In stools in various types of latrines.
      (*d*) In buried feces.

2. Hatching of eggs and development of larvae under various environmental conditions.
   (*a*) Will hookworm eggs hatch in buried feces ?
   (*b*) Hatching and development in various types of latrines.
   (*c*) Conditions necessary for hatching and development when deposited on the soil or in water.
      (1) Food.
      (2) Moisture.
      (3) Temperature.
      (4) Chemical conditions.

II. The infective larvae.
   A. Length of life.
      1. Under conditions favorable for great activity.
      2. Under conditions which favor inactivity.
      3. In various types of soils.
      4. Length of time various soils remain infective after pollution stops.

   B. Conditions necessary for life.
      1. Amount of moisture needed.
         (*a*) Effect of large amounts of moisture.
         (*b*) Resistance to desiccation.
      2. Chemical relations.
         (*a*) Favorable and unfavorable chemical situations in natural environment.
         (*b*) Effect of various chemical agents.
         (*c*) Disinfection of infested soil.

   C. The spread of the infective larvae.
      1. Active migrations.
         (*a*) Horizontal migrations from pollution centres.
            (1) Effect of temperature.
            (2) Effect of moisture conditions.
            (3) Effect of physical character of the soil.
            (4) Effect of chemical character of the soil.
            (5) Effect of vegetation.
         (*b*) Vertical migrations.
            (1) Depth of vertical migrations under favorable conditions.
            (2) Possible upward migration when larvae are buried.
            (3) Possible downward migration when upper surface of soil dries.
      2. Passive spread of infective larvae.
         (*a*) By man.
         (*b*) By animals other than man.
         (*c*) By physical agencies.
            (1) By rain.
            (2) By streams of water.
      3. The distribution of infective larvae in an infested area.
         (*a*) With respect to centres of soil pollution.
         (*b*) In relation to disposal of human wastes.
         (*c*) With regard to sources of human infestation."

In certain regions chickens, dogs and pigs ingest human faeces in quantity. The real significance of this in the spread of hookworm calls for investigation. So does the viability of eggs in the naturally deposited stool and in various types of latrines. Desiccation quickly kills the hookworm larvae, but investigations ought to be made to determine the minimum of moisture which the larvae require in various types of soil. It is also an unsolved problem whether the hookworm larvae can migrate into the lower layers of the soil as the upper layers become dry. Information is needed, too, concerning the actual extent to which larvae naturally migrate in the soil from centres of infestation.

II. **The Description of an Apparatus for Isolating Infective Hookworm Larvae from Soil.** [CORT, ACKERT, AUGUSTINE & PAYNE (F. K.)].

The apparatus devised by BAERMANN in 1917 [see this *Bulletin*, Vol. 19, p. 254] has made it possible to study the activities of the infective hookworm larvae in the soil and to determine accurately the sources of infestation in any region. The underlying principle is that when the lower surface of a soil sample is brought into contact with water of a considerably higher temperature, a large proportion of the nematodes in the sample will pass into the water and can be collected and counted. The apparatus is composed of a glass funnel almost filled with water with the outlet closed by a clamped piece of rubber tubing. Half a pint or more of soil sample is placed in a brass sieve (7 in. by 3 in. with a 1 mm. mesh), which is then fitted down into a funnel 8 in. in diameter. The sieve is lined with cloth to prevent small particles of soil from sifting through the sieve. The funnel is filled with water at 115° F., to within 1½ in. of the rim, so that when the sieve is placed in position there should be no contact between the water and the bottom of the sieve. Water of the same temperature is then poured over the rim of the funnel until it is practically full and the level of the water almost an inch above the bottom of the sieve. The sample is left standing over night, and a quantity of water is then drawn off into a centrifuge tube through the rubber tubing.

Free-living Nematodes are almost always present. A few drops of 5 per cent. formalin mixed on the slide killed these, while the mature hookworm larvae, both sheathed and unsheathed, would remain active for some time. As numbers of unsheathed larvae occur in the soil, these hookworm larvae have to be identified by their structure and movements. Under favourable conditions at least 50 per cent. of the larvae experimentally inoculated into soil were recovered by this apparatus. To obtain satisfactory results, the temperature of the water must be at least 10° F. higher than that of the soil. The average percentage of larvae isolated was constantly less from saturated than from moist soil. The great majority of the larvae which can be recovered pass into the water within six hours, but an appreciable number can only be recovered after a longer period.

III. **A Discussion of the Finding of Unsheathed Hookworm Larvae in the Soil.** [CORT, AUGUSTINE, ACKERT, PAYNE (F. K. & G. C.).]

Previous workers have been so influenced by the idea that the infective larvae live normally in sheaths that the occurrence of unsheathed larvae was regarded as indicative of abnormal conditions. The results of investigations made by the authors in Trinidad with BAERMANN's apparatus show that a large percentage of larvae complete their second moult in soil and live in the unsheathed condition. In a series of samples taken from a cacao grove, where concentrated centres of soil pollution occurred, 2,159 infective larvae were counted, of which 83·6 per cent. were sheathed and 16·4 per cent. unsheathed. In another series of samples, from a highly polluted sugar-cane field, 42 per cent. of the larvae were sheathed and 58 per cent. were unsheathed. This unsheathing appears to be greater in soil which is exposed alternately to sunlight and shade than that constantly in the shade.

IV. **The Relation of the Domestic Chicken to the Spread of Hookworm Disease.** [ACKERT (J. E.).] See this *Bulletin*, Vol. 19, p. 663.

V. **The Domestic Pig and Hookworm Dissemination.** [ACKERT (J. E.) & PAYNE (F. K.).] See this *Bulletin*, Vol. 19, p. 664.

VI. **A Study of the Effect of Hookworm Control Measures on Soil Pollution and Infestation in a Sugar Estate.** [CORT & PAYNE (G. C.).]

The results are recounted of an intensive epidemiologic study of a sugar estate in Trinidad, designed to determine the exact source of human infestation and the effect of a control campaign on human infestation, soil pollution and soil infestation. 117 out of 142 people examined from the area were found to be infested with hookworms. A series of three treatments greatly reduced the number of infested individuals and the total mass infestation of the people.

Surveys of the pollution in the cane field showed a great reduction after adequate latrines had been built and an educational campaign had been enforced. Examination of soil samples from the area showed very little soil infestation with hookworm larvae except along a heavily polluted strip of cane. This localized character of soil infestation, especially in the cane field, showed that there was little migration of infective larvae, although there was some evidence that these were carried considerable distances by water. The heavy infestation of the people was due to the prevalent habit of visiting certain places in the cane field for defaecation.

After the reduction of soil pollution in the cane field and the treatment of the people in the area, series of samples taken at intervals showed a rapid dying out of the infective larvae, so that in about six weeks soil infestation was practically eliminated.

VII. **An Epidemiologic Study of Hookworm Disease in a Cacao Estate.** [CORT & PAYNE (G. C.).]

An epidemiological study was made of the conditions influencing the spread of hookworm disease on a cacao estate with the object of locating the sources of human infestation and determining the reduction of soil infestation produced in localized centres of pollution in a cacao grove after the treatment of the people who visited these spots.

The people living in three houses on the estate showed heavy infestation with hookworms. It was found that soil pollution was almost entirely limited to definite spots in the cacao grove which had been used as "natural latrines."

Examination of soil samples revealed very little soil infestation anywhere in the area except at these natural latrines, and it is concluded that the infections were acquired there. No evidence of soil pollution was found around the houses and very little around the two barracks in the area. Where centres of soil infestation had developed in the cacao grove the examination of soil samples gave surprisingly irregular results considering the constant pollution and heavy infestation of those visiting the spots. The irregularity might be attributable to (*a*) the presence of leaves in the soil, which complicated the sampling, (*b*) variations in the degree of infestation of the people, (*c*) development at certain spots of conditions unfavourable to the larvae.

The examinations of the soil of the intensely polluted spots six weeks after three routine treatments had been given to the people showed a very marked reduction of soil infestation, indicating that in this situation the life of the infective larvae is short. Whereas samples taken before treatment contained 1,872 larvae, those taken six weeks later revealed only 89 larvae.

VIII. **Experiments on the Migration of Hookworm Larvae in Soils.** [AUGUSTINE.]

The current opinion is that infective hookworm larvae move out from centres of infestation and spread themselves over wide areas. Experiments were made by the author in Trinidad to determine to what extent the migration of larvae occurs from definite infested centres in soils of various types and under varying conditions. The larvae used were from five to eight days old. In no case, in a series of experiments, were the larvae found to have migrated as far as four inches from the centre in where they were placed. Neither the type of soil used nor the presence of vegetation were factors in the extent of active migration of the larvae. It was noted that there occurred a remarkable reduction from the original number of larvae placed experimentally in the infestation centres, even after a week's time. The author reaches the conclusion that very probably it is only by mechanical means that hookworm larvae can spread from the place of their development.

Experiments also showed that infective larvae cannot migrate from a drying area to a moist area of soil near by; they can, however, be carried away from centres of soil infestation by surface water and can establish themselves in the new locations when the water recedes. Soil scraped from the shoes of men passing through infested areas was found to contain larvae varying in number from 2 to 344 on one person.

Domesticated animals are similarly disseminators.

IX. **On the Position of the Infective Hookworm Larvae in the Soil.** [AUGUSTINE.]

Under optimum conditions of moisture and temperature, infective larvae were found to remain on and within the upper surface of the soil. They creep up pieces of wood, decaying vegetation and other objects only as far as the film of moisture extends. Larvae were not found in the drops of water collected from the axils of the leaves of green plants nor on the leaves. At centres of soil infestation where the surface is covered with leaves or twigs the larvae were found to be extended from the leaves or twigs when moist. Even at a temperature of 101° F. and in direct sunlight the larvae were found so extended from soil particles so long as the soil remained moist. As the soil surface became drier they left their more prominent positions and were found in the deeper cracks and crevices, disappearing altogether if the drying continued, but reappearing again on the addition of water.

X. **Experiments on the Length of Life of Infective Hookworm Larvae in Soils.** [AUGUSTINE.]

Laboratory experiments and field observations in Trinidad show that the life of hookworm larvae is limited to six weeks in the soils of Trinidad, where the daily temperature ranged from 74° F. to 94° F.,

a temperature which tended to keep the larvae active and consequently to exhaust rapidly their food reserve. A large proportion of the larvae lost their sheaths in the soil. This completion of the second ecdysis presents a new factor in determining the length of life of the larvae, for it renders them more susceptible in unfavourable environments. The unsheathed larvae were shown experimentally to be still infective.

XI. **Vertical Migration of Infective Hookworm Larvae in the Soil. (Preliminary Report.)** [PAYNE (F. K.).]

Practical hookworm control may be affected by the possible retirement of the larvae during dry weather from the surface to zones of greater moisture, and by the possible upward migration of larvae which are beneath the surface. Studies of these migrations should assist in evaluing methods of excreta disposal. The author has conducted careful experiments to determine whether larvae buried at a known distance can reach the surface in sufficient numbers to produce an infective focus. The results show that in garden soil with uniform conditions of moisture throughout very few larvae of *Necator americanus* migrate more than two inches above the point of inoculation. In water-logged soil of the same type there was little migration and apparently a very high death-rate. In garden soil in which conditions of rising ground-water were simulated 74·4 per cent. of the larvae found had migrated three or more inches, 15·4 per cent. five or more inches, while a few had migrated more than 7½ in. Migration was apparently more difficult in specimens of fine sand and mixtures of clay and sand than in garden soil. A diminution in the food granules in the gut-wall of the larvae was noticeable after vertical migrations of only one or two inches, and their almost complete disappearance occurred in those which had migrated for five or six inches.

R. T. L.

DE NOOIJ (J. A.). **Onderzoek naar het voorkomen van ankylostomenlarven in den grond in kampongs te Batavia.** [Research concerning the Presence of Ankylostome Larvae in the Soil of Native Villages at Batavia.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1922. Vol. 62. No. 3. pp. 290–305.

Using BAERMANN's method (see this *Bulletin*, Vol. 12, p. 181), the author examined samples of soil in the native villages for hookworm larvae. The surroundings of the primitive privies were found to be the most infested spots. The differentiation between hookworm larvae and those of free-living nematodes is discussed. In their larval stage dogworms (*Ancylostoma ceylanicum*) cannot be distinguished from human hookworms. An experiment showed that flies, as well as their larvae, may transmit the hookworm larvae. This may be important for the spread of hookworm infection in certain circumstances. Contrary to the opinion of LOOSS that "the mature ankylostoma larvae cannot withstand desiccation even for the space of a second," de Nooij found that the larvae can bear a considerable degree of desiccation. After 24 hours in the incubator at 37° C. and 1½ hours' exposure to the sun they could be easily revived by contact with water. An occasional laboratory infection with canine hookworms did not result in appearance of the ova in the faeces.

W. J. Bais.

i. MINAGAWA (Koki). **Supplemental Studies on the *Anchylostoma duodenale* Dubini.**—*Mitt. a. d. Med. Fak. d. Kais. Univ. Tokyo.* 1920. Vol. 23. No. 2. pp. 149–170.

ii. ——. **Experiments in the Prevention of the Hookworm Disease.**—*Ibid.* pp. 171–187. With 2 plates.

i. The development of hookworm ova and larvae succeeds better in water than in moist air. The depth of pure water does not adversely affect development, but when the water is putrescent, or contains easily oxidizable substances, the ova and larvae, save in very shallow fluid, remain quiescent or die. When faeces containing ova is diluted, the duration of the latent life of the ova is in direct proportion to the dilution and in inverse ratio to the density. In faecal matter floating on water the ova complete their development, and in this supernatant matter the encysted larvae can survive, but they die when it sinks. In greatly diluted faeces the ova retain vitality longer if the receptacle is an open one. Carbonic acid, ammonia and other gases dissolved in water act destructively upon the vitality of the ova. A 1 per cent. solution of ammonium carbonate destroys hookworm ova in five days. Human urine is very efficient against hookworm ova.

ii. Using *Ancylostoma caninum* ova derived from dogs' stools, the author made a series of experimental tests of the practical value of admixing urine with infected faeces. The faeces were mixed with human urine and left to putrefy and ferment for ten days. The mixture was then scattered in experimental pits in the same manner as a farmer manures land in Japan. Later several young dogs were placed in these pits. As controls similar mixtures were made with water and similarly used. In the dogs placed in the pit fertilized with the urine-faeces mixture the largest number of hookworms found was 26. In the dogs placed in the pit manured with the mixture of faeces and water the worms found exceeded 10,000. It follows that putrefaction and fermentation of faeces is insufficient to destroy hookworm ova, but when ammoniacal fermentation is effectively induced the destructive action is great. The experiments point to practicable measures for the eradication of hookworm in the Far East.

R. T. L.

CIFUENTES LABASTIDA (R.). **La anquilostomosis como coeficiente importante de la despoblación venezolana. Su enorme difusión en el territorio. Vias de penetración. Ligero estudio comparativo con otras enfermedades que diezman la población. Proyecto de profiláxia contra el Anquilostomo.** [Ankylostomiasis an Important Factor in the Depopulation of Venezuela. Its Extensive Prevalence. Portals of Entry. Comparison with other Decimating Diseases. Scheme for Prevention.]—*Gac. Méd. de Caracas.* 1921. Sept. 30. Vol. 28. No. 18. pp. 283–287.

Successive census returns reveal the fact that the population of Venezuela remains almost stationary in spite of the fact that the birth-rate shows a satisfactory increase. Malaria is well known but, as the treatment and preventive measures are universally recognized, this disease is not as fatal now as in former days. Tetanus and puerperal fever are also causes easily remediable by education on the one hand and by the institution of legal measures to regulate practice by untrained midwives on the other. Tuberculosis, which contributes largely to the mortality returns, is also becoming a less potent factor.

The geographical distribution of hookworm in Venezuela shows that the prevalence is less among the parts which are supplied with filtered water, and that the children in such districts are often infected through the habit of geophagy. Greater stress is laid on infection by the alimentary route than by the cutaneous. Other modes are mentioned, such as the infection of pottery workers, who mould the clay with their hands; of those who are employed in plastering walls, in which earth is used; those engaged in agriculture; in fact all those who soil their hands with earth and transfer the ova and larvae to their noses and mouths.

"Ground itch" is often complained of in the earliest stages, and is known locally by the name of "sabañones" [literally, chilblains], but this mode of infection is not the commonest, since workers on land impregnated with ova and larvae are, he states, relatively few.

The author takes a somewhat pessimistic view of the effect of treatment. The anaemia and other debilitating results of infection do not readily clear up and are often permanent, and the patient becomes an easy victim to intercurrent disease. The juice of Higueron is most satisfactory.

The author recommends that the numerous local springs and sources of supply should be fitted with filters. These should be covered with galvanized iron and a trained man put in charge to repair defects and renew the filtering medium when needed.

H. Harold Scott.

BURGA (Buenaventura). **Demostración de la existencia de la anquilostomiasis en la provincia de Moyobamba donde se la llama poshequismo.** [Ankylostomiasis (locally Poshequismo) in Moyobamba.]—*Cronica Méd.* Lima. 1921. Aug. Vol. 38. No. 698. pp. 274–278.

The inhabitants of Moyobamba, the capital of San Martin in the Andes, are much infected with hookworm. Here and in the Rioja district, where rains are heavy, the soil damp, and the relative humidity very high, 90 per cent. of the men were found to harbour ankylostomes. In Tarapoto, in the same department, but with a warm dry atmosphere and little rain, ankylostomiasis is rare. The men are affected to a much greater extent than the women; the former live by agricultural work, the latter by hat-making. They are poor and underfed, they live in insanitary surroundings, and nearly all suffer from malaria, which is allowed to go untreated owing to the high cost of quinine.

The author treats his hookworm patients with thymol by the 45-gr. method divided into three doses, and reports great success. Oil of chenopodium was abandoned because of the toxic symptoms produced. After expulsion of the worms he treats the anaemia with protoxalate of iron, of which he speaks highly.

H. Harold Scott.

LEGER (Marcel). **L'infestation par ankylostomes à la Guyane française.** —*Ann. de Méd. et de Pharm. Colon.* Paris. 1921. April–May–June. Vol. 19. No. 2. pp. 135–146.

An historical analysis is followed by an account of the present degree of infestation, which appears to be characterized by a high percentage of sickness amongst the infected. The conclusion is that the serious nature of the problem requires vigorous educational, hygienic and therapeutic measures.

R. T. L.

KOFOID (Charles A.) & TUCKER (John P.). **On the Relationship of Infection by Hookworm to the Incidence of Morbidity and Mortality in 22,842 Men of the United States Army at Camp Bowie, Texas, from October 1917 to April 1918.**—*Amer. Jl. Hyg.* Baltimore. 1921. Jan. Vol. 1. No. 1. pp. 79–117. With 3 text figs.

A survey of 22,842 men at Camp Bowie, Texas, showed 3,079, or 13·5 per cent., positive for hookworm.

Positives for hookworm showed an apparent increased susceptibility for tonsillitis, laryngitis, bronchitis, pneumonia and measles, due in part to rural isolation and lack of previous attacks by these infections, and to rural conditions favouring hookworm infection. Morbidity and mortality from many causes and the incidence of mortality from pneumonia showed a general correlation with that of hookworm infection. Hookworm is one of a vicious circle of factors favouring inefficiency, morbidity and mortality among U.S. army troops. It would be more profitable to eliminate infection from every soldier on recruitment than to allow him to remain untreated.

R. T. L.

KOFOID (Charles A.). **The Geographical Distribution of Hookworm Infection in the United States, detected in Army Recruits.**—*Amer. Jl. Trop. Med.* Baltimore. 1922. Sept. Vol. 2. No. 5. pp. 389–396.

501,472 recruits from all parts of the United States were examined during the war for hookworm, by a single examination as a rule; 11·3 per cent. were positive. An analysis was made of the States in which 126,140 men were born. 114,408 came from the Southern States and the infection rate was 17·01 per cent. Of these 3,872 came from Georgia, having the highest rate, 32·6 per cent.; the District of Columbia and Missouri had the lowest, 1·6 per cent. and 1·8 per cent. respectively. Recruits from the Mississippi Valley showed 1·69 per cent. positive (5,664 examined), those from the Pacific Slope 2·5 per cent. (1,710 examined), and from the North-Eastern States only 0·84 per cent. (4,358 examined) were infected with hookworm.

Reference is made to the reduction of intellectual efficiency, stated by MYERS (1920) and WAITE (1919) [see this *Bulletin*, Vol. 18, p. 135] to be 25 per cent., and also to the writer's own article in conjunction with TUCKER (1921) [see above] on the incidence and severity of other diseases in persons infected with hookworms.

R. T. L.

DARLING (Samuel T.). **Recent Researches on Hookworm Infection in Indonesia.**—*Indian Med. Gaz.* 1919. Dec. Vol. 54. No. 12. pp. 446–453.

Slight ankylostomiasis, unaccompanied by malaria, usually shows no anaemia, since compensation is established. But when the worm index runs into hundreds, the worm count and the anaemia are reciprocal for a large similar group of people; individuals vary greatly in their haemopoietic powers. The percentage of haemoglobin depended on the sex and age, and on pregnancy; and comparing different kampongs in Java, depended also upon the incidence of malaria, in which condition there was no close correspondence between

the degree of anaemia and the number of hookworm harboured. In cases with a measurable amount of anaemia the author found that a loss of 1 per cent. of haemoglobin was occasioned by 11·7 worms in men, 10 in women, and 7·6 in boys. The advantage of treatment of coolies is shown below.

	Change in Haemoglobin.
Free from malaria, treated for hookworm, sent to non-malarial estates	+15·2 per cent.
Free from malaria, not treated for hookworm, sent to non-malarial estates	+ 6·0 ,,
Free from malaria, treated for hookworm, sent to malarial estates	− 5·7 ,,
Free from malaria, not treated for hookworm, sent to malarial estates	−10·44 ,,
Infected with malaria, treated for hookworm, sent to malarial estates	+15·8 ,,
Infected with malaria, not treated for hookworm, sent to malarial estates	+11·7 ,,

The author found oil of chenopodium, 3 cc. in three divided doses, the most efficient vermifuge; this removed 96·8 per cent. of necators and 76·6 per cent. of ankylostomes; two treatments with 1·5 cc. in divided doses removed 99·03 per cent. of worms.

The initial purge may be omitted, and a light diet is necessary, but complete or almost complete starvation remarkably diminishes the number of worms removed.

R. T. L.

SMILLIE (Wilson G.). **A Comparison of the Number of Hookworm Ova in the Stool with the Actual Number of Hookworms harbored by the Individual.**—*Amer. Jl. Trop. Med.* 1921. Nov. Vol. 1. No. 6. pp. 389–395. With 1 chart in text.

The number of ova in the stools frequently gave no trustworthy index to the number of hookworms harboured. When cases were considered in groups there was a definite and fairly constant correlation. From a study of 135 cases it is shown that great variations appear. An individual harboured as many as 28 hookworms, and yet the stool gave a negative microscopic result. Another individual presented a stool specimen in which the ova could only be found by the centrifuge method, yet 168 hookworms were found to be present by subsequent treatment. In a further case a single female hookworm alone was present, yet the microscopic examination of the stool showed a considerable number of ova. In 18 out of 135 cases the microscopical results were negative, but in these only a few worms were present.

R. T. L.

CORT (William W.). **A Graphic Analysis of Certain Factors in Hookworm Control.**—*Amer. Jl. Trop. Med.* Baltimore. 1922. Sept. Vol. 2. No. 5. pp. 449–462. With 1 text fig.

The worm index is the only guide to effect of a hookworm campaign. Examination for ova returns as positive persons who harbour only a few worms, and thus may reveal no apparent improvement, whereas the average number of worms may have been reduced from hundreds to units. The haemoglobin index is of some value (this may be masked

by endemic malaria). The estimation of the number of eggs is of some value when dealing with large communities; individually it is valueless. Soil infestation estimates are valuable, but depend on climatic conditions. A number of hypothetical graphs of the relation between soil pollution, soil infestation and human infestation, based on present knowledge, shows that mass treatment is very effective, sanitary measures alone are practically useless; the best possible combination being sanitary measures carried out for the period of the life of the larvae in the soil followed immediately by mass treatment, producing simultaneously low infestation both of the soil and the host. It is suggested that dry or cold seasons, when climatic conditions cause low soil infestation, might be utilized for occasions for mass treatment.

R. T. L.

McVail (J. Borland). **Annual Report of the Work of the Hook Worm Research Laboratory.**—*Ann. Report of Work done in the Calcutta School of Trop. Med. and Hyg. under the Endowment of the Indian Tea, Jute and Mining Association.* [1921.] pp. 37–50.

Clayton Lane's "Levitation" method has proved satisfactory, but a simpler method not necessitating the use of so much apparatus is recommended. About half a gramme of stool is shaken vigorously in a test tube with the minimum quantity of water which will produce a thick fluid emulsion. This is poured on to a slide in a space between grease-pencil boundaries and allowed to stand for ten minutes. The slide is then immersed gently in water to float off the debris and examined under the microscope. Although hookworm is called a disease of the tropics the development of the ova is almost totally inhibited at a temperature of 98·4° F. Mature larvae kept in water at this temperature soon show degenerative changes, the capsule becomes soft and sticky, and within 14 days or less most are dead. The author suggests that it might be possible to utilize the heat of natural fermentation to devise a temporary latrine in which faeces would be sterilized from hookworm. The effluents of 59 septic tanks were examined, and eggs or larvae of hookworms were found in 19. Ordinary clothing is readily penetrated by the larvae, but closely woven materials can be proofed temporarily with boiled linseed oil. As wet leather is penetrated a linseed oil soaking may be useful for boots to be worn by planters in rainy weather or marshy soil. Sterilization of soil requires chemicals of too high concentration to be commercially practicable. Sunlight kills the larva by temperature. In the laboratory a few larvae were found to penetrate unscreened sand to a depth of 7 inches in a week.

R. T. L.

de Almeida, Junr., & Pessoa (Samuel B.). **A prova de Schneider nas crianças e nos ancylostomados.** [Schneider's Test in Children and in those Infected with Hookworm.]—*Brazil Medico.* 1922. Nov. 25. Year 36. Vol. 2. No. 47. pp. 331–335.

Schneider's test, originally brought forward as a "Cardio-vascular Rating as a Measure of Physical Fatigue and Efficiency," with a system of scoring by points the various results obtained from different examinations, such as the pulse-rate when recumbent, the increase

on rising, the rate when standing, the increase immediately after exercise, the time taken for it to return to normal after exercise, etc., showed, as would be expected, departures from the normal in hookworm cases, namely, a lowering of physical resistance and earlier onset of fatigue. The patients examined by the authors were but slightly infected, and they conclude that the differences were too small to warrant their making any deductions of value from the test.

H. Harold Scott.

FLU (P. C.). **Onderzoekingen over de oorzaken der anaemie bij ankylostomiasis.** [Cause of Anaemia in Ankylostomiasis.]—*Tijdschr. v. Vergelijkende Geneesk. enz.* 1922. Jan. 23. Vol. 7. No. 1. pp. 47–71. [English Summary, pp. 71–72.]

The author considers that anaemia in ankylostomiasis is due chiefly to the small but repeated haemorrhages produced by the worms, and he cites examples of profuse haemorrhages caused by hookworms. In support of his supposition he mentions also the presence of an anticoagulant in the anterior part of the worm and the absence of haemolytic or haemotoxic substances in the watery extract of the anterior part of the adult worm.

R. T. L.

MCVAIL (J. Borland). **The Blood Count in Ankylostomiasis. A Warning.**—*Indian Med. Gaz.* 1922. Oct. Vol. 57. No. 10. pp. 366–367.

A comparison is made of a number of differential counts of cases of :—(*a*) ankylostomiasis uncomplicated with malaria ; (*b*) ankylostomiasis and malaria ; (*c*) ankylostomiasis and kala azar.

(*a*) Average leucocyte count 10,482·5 ; eosinophiles 19·3 per cent., 2,781 per cmm.

(*b*) Average leucocyte count 7,083·3; eosinophiles 11 per cent., 834 per cmm.

(*c*) Average leucocyte count 4,457; eosinophiles 1·7 per cent., 76·78 per cmm.

The conclusion is that cases of ankylostomiasis showing little or no eosinophiles should be examined at once by spleen puncture or Napier's test.

R. T. L.

LEMIERRE (A.) & LANTUÉJOUL (P.). **Evolution de l'éosinophilie sanguine au cours de l'ankylostomose duodénale. (A propos d'un cas personnel.)**—*Ann. de Méd.* 1920. July–Dec. Vol. 8. pp. 409–417.

In a case having 50 per cent. haemoglobin and 16 per cent. eosinophilia, treatment caused the eosinophilia to rise, in three weeks, to 37 per cent., and the haemoglobin to 70 per cent. ; after which period the haemoglobin continued to rise and the eosinophilia gradually fell to 7·8 per cent. five months later. This is contrasted with the rapid and immediate fall observed after the removal of hydatid cysts. It is suggested that whilst the toxic effect of the worms causes a continued abnormal output of eosinophiles, the removal of the worm

results in the immediate diminution of local eosinophilia of the intestine causing a rise of eosinophiles in the peripheral blood. The coincidence of anaemia and a low eosinophile count, and the rise of eosinophiles accompanying the early stages of increase of haemoglobin, are discussed.

R. T. L.

HAYASHI (Shunzo). [**On Hemolytic and Antihemolytic Substances found in the Serum of Ankylostomiasis. (1. Communication.)**]—*Chuo Igakkwai Zasshi* (*Jl. of Central Med. Soc.*). 1921. May. No. 156. [Summarized in *Japan Med. World.* Tokyo. 1921. Oct. 15. Vol. 1. No. 6. p. 18.]

Serum from a case of ankylostomiasis with slight anaemia contained thermostabile antihaemolysins, but the author was unable to demonstrate that the serum had been affected by haemolytic substances in the body of the worm. In cases with a medium degree of anaemia the serum was less haemolytic for goat corpuscles than normal serum or serum from cases of ascariasis; indeed in the last disease the haemolytic action is sometimes increased. The normal amboceptor of the human serum is unaffected by heating to 56° C., but markedly weakened by a temperature of 62° C.

R. T. L.

FÜLLEBORN. **Nachweis von Ankylostomen und Strongyloides durch Plattenkotkultur. (Vorläufige Mitteilung.)**—[Detection of Ankylostomes and Strongyloides by Plate Culture. Preliminary Communication.]—*Arch. f. Schiff- u. Trop.-Hyg.* 1921. Vol. 25. No. 4. pp. 121–123. With 1 text fig.

A combination of LOOSS and BRUN's method of stool culture with the agar plate technique is advocated for the detection of ankylostoma and strongyloides.

Ordinary amoeba agar is employed. In the centre of the plate faeces is spread ½–1 cm. thick, a free edge of at least 3 cm. being left around the dish. In a few days the growing worms become visible even to the naked eye on account of the tracks they make. Such a plate is easily examined by microscope—if worms are scarce, a piece of agar is cut out and the hole filled with water, into which the worms creep; the whole plate may be covered with water if preferred. Greatest development takes place at 25–30° C.; higher temperatures affect the sexual generations of strongyloides adversely. At 27° C. the first strongyloides filariform larvae (arising without intervention of adults) are seen, and their tracks appear after 24 hours. At this temperature the first ankylostome tracks appear only after 48 hours. The first ripe larvae of *Ancylostoma duodenale* and *Necator americanus* appear after three to four days.

R. T. L.

GORDON (R. M.). **The Occurrence of Ancylostomes resembling *Necator americanus* amongst Domestic Pigs in Amazonas.**—*Ann. Trop. Med. & Parasit.* 1922. Oct. 18. Vol. 16. No. 3. pp. 295–296.

Fifteen pigs were examined at Manaos on the Amazon. These were of the domestic variety and had been kept in or around native dwelling-houses. Their ages varied from young "sucking-pigs" to full-grown

adults. In ten of the pigs ankylostomes corresponding with *Necator americanus* in all respects, except that of size, were collected. In one animal, 75 worms occurred. The total number collected was 175. Twenty-eight males varied in length from 6·5 mm. to 4·5 mm., averaging 5·1 mm. Sixty-four females ranged from 8·2 mm. to 5·5 mm., averaging 6·5 mm. The spicule of the male averaged 0·48 mm. in 12 specimens. Some of the females were gravid [but no measurements of the eggs are given]. The author considers that the pig, in this locality, plays a part of some importance in the spread of ankylostomiasis. No specimens of *A. duodenale* were found, but the author has examined and confirmed the discovery of *A. duodenale* in pigs at Townsville, Australia. He refers also to Dr. O'Connor's earlier record from Samoa [concerning the validity of which some doubt exists].

R. T. L.

i Caius (J. F.) & Mhaskar (K. S.). **An Inquiry into the Correlation between the Chemical Composition of Anthelmintics and their Therapeutic Values in Connection with the Hookworm Inquiry in the Madras Presidency. A Progress Report.**—*Indian Jl. Med. Res.* 1921. Apr. Vol. 8. No. 4. pp. 737–740.

ii. —— & ——. **The Correlation between the Chemical Composition of Anthelmintics and their Therapeutic Values in Connection with the Hookworm Inquiry in the Madras Presidency. XVI. Propenyl Phenols.**—*Ibid.* 1922. Oct. Vol. 10. No. 2. pp. 343–360.

i. The compounds examined to date are classified chemically and these classes compared.

(*a*) No anthelmintic properties: *Hydrocarbons, e.g.*, oil of turpentine; *Alcohols, e.g.*, ascaridole glycol from oil of chenopodium; *Aldehydes*; *Ketones, e.g.*, santonin and liquid extract of male fern; *Alkaloids, e.g.*, Pulvis arecae; *Polyhalides*, chloroform may be useful as a narcotic coupled with a purge.

(*b*) Vermicidal but not vermifugal: *Oxides, e.g.*, eucalyptol weak; *Peroxides, e.g.*, ascaridole very strong.

(*c*) Vermicidal and vermifugal: *Phenols*, their value may be diminished or destroyed by substitution in the benzene ring; the most efficient are mono-phenols of di-substituted benzene compounds.

ii. Pseudoallyl phenols do not occur naturally, but allyl and isoallyl derivatives are found in many of the essential oils, and are all characterized by the presence of phenolic hydroxyl in the *para* position to the C_3H_5 side chain; and it is these two latter classes of compounds which have been examined. These have marked anthelmintic properties, which do not appear to be dependent upon the configuration of the propenyl group, but upon the condition of the *hydroxy* group in the *para* position. Esterification weakens or destroys the anthelmintic power, whereas etherification, whilst weakening or destroying the vermifugal effect, only in certain cases modifies the vermicidal character of the derivatives. The authors find that whilst the vermicidal action of the methyl ether resembles that of thymol or β-naphthol that of the methylene ethers resembles oil of chenopodium.

R. T. L.

Mhaskar (K. S.). **Mass Treatment of Hookworm Infection.**—*Indian Med. Gaz.* 1922. June. Vol. 57. No. 6. pp. 208–210.

Fifty-four substances were investigated, and the conclusion was that oil of chenopodium, thymol and β-naphthol were the only effective

drugs; excepting chloroform under hospital conditions. The first varies greatly in composition, being easily adulterable, does not keep well, and is highly toxic; therefore the determination of the optimum dose is a matter of difficulty and is of great importance. Thymol and β-naphthol can be obtained chemically pure, and being much less toxic do not require an after-purge nor restriction of food. The optimum dose is 50 gr., but should be reduced for debilitated persons in the case of β-naphthol, which is much the cheaper drug. This treatment need not be repeated, as apparent failures generally result in delayed cures [see paper by same author, this *Bulletin*, Vol. 19. p. 662], and 93 per cent. of cures was experienced with this treatment. The work was carried out on a large number of cases both in Trichinopoly jail and on tea plantations.

R. T. L.

DARLING (Samuel T.). **The Hookworm Index and Mass Treatment.**—*Amer. Jl. Trop. Med.* Baltimore. 1922. Sept. Vol. 2. No. 5. pp. 397–447. With 3 text figs.

The worm index is the only reliable guide, both to the number of persons infected and to the heaviness of infection. It is this latter point that is important. Heavily infected areas should be dealt with before places with a low worm index; both because a light infection is innocuous whilst a heavy one means more or less severe anaemia and poor general health, and because a high worm index entails a high infestation of the soil. Populations with a high worm index require mass treatment, *i.e.*, all must receive vermifuges within a short space of time. The average life of the larva being four weeks in the tropics, the soil pollution will diminish rapidly, and since the parasites are acquired slowly, about 12 worms a year in the Javanese, a high index will not be attained from a lightly infested soil and a lightly infested population cannot restore a heavily infested soil. The author considers this method quite possible, even with difficult races, whereas it is almost impossible to alter tribal and religious hygienic customs. He indicts heavily the latrines usually provided, as "filthy" and generally placed at an inconvenient place and too far from places of occupation on plantations. It is undesirable to waste time and funds on trying to get complete cures. One treatment cures 28 per cent., but removes 90 per cent. of the worms. Two treatments cure 49 per cent., but remove 97 per cent. of the worms.

The article deals with the Orient. The degree of infestation is dependent on occupation and personal hygiene, as is shown by a low worm index for town populations, a higher one for fishing villages and "protected" agricultural populations (*i.e.*, those provided with latrines which some use), and highest for unprotected agricultural populations. Mountain districts are unaccountably low, and the worm index for boys is higher than for anyone else. Usually the men have the highest W.I. (worm index), then the boys, then the women, and then the girls. But this is not a sex phenomenon, as on rubber estates where Tamil women work at the trees and the children weed and the men work indoors, the figures are reversed.

Comparing Javanese coolies, it was found that "Road Coolies" had a W.I. of 102, and had 1·69 *Ancylostoma duodenale*; "Night-soil Coolies," *i.e.*, those who carried away and buried the faeces of the Chinese population, had a W.I. of 169, and had 14·4 *A. duodenale*: the higher proportion of *A. duodenale* confirms the fact that they

were infected by their occupation, since the Chinese have a larger number of ankylostomes than the natives. These ankylostomes are acquired at the rate of about three per annum. The racial hygiene varies greatly: the Tamils defaecate anywhere; the Chinese and Mohammedans are required to perform ablutions of the anus and genitalia after defaecation or urination, and generally choose a stream or pond. About half the Javanese defaecate into streams in which they wash their bodies, their clothes and their food. The author suggests that the higher degree of infestation among the white people in the Southern States of America is due to their using privies or the barnyard, whilst the negroes, defaecating anywhere, spread their faeces over a wide area and produce a lighter infection.

R. T. L.

ROUSSEAU (Louis). **Quelques observations relatives au traitement de l'Ankylostomiase.**—*Bull. Soc. Path. Exot.* 1922. Feb. 8. Vol. 15. No. 2. pp. 127–131.

Twenty-four prisoners on the Iles de Salut, French Guiana, infested with ankylostomes (chiefly *A. duodenale*) were treated with various vermifuges. The best results were obtained with chloroform (4 gm.) and bromoform (3 gm.); β-naphthol and thymol were inferior. Essence de Niaouli had a slight ankylostomicidal action, and male-fern had no value, the results obtained being solely attributable to the chloroform in the preparations. Eucalyptus was useless. Castor oil (30 gm.) accompanied all vermifuges except thymol and β-naphthol, with which a saline purge was used. Oxyurids were very common. The author corrects an error made by him (*Bull. Soc. Path. Exot.*, 1921, Feb., p. 130): he mistook oxyurids, males and immature females, for the intestinal form of strongyloides killed and expelled by thymol, though his observations on the other forms of strongyloides are confirmed.

R. T. L.

HALL (Maurice C.). **The Use of Carbon Tetrachloride for the Removal of Hookworms.**—*Jl. Amer. Med. Assoc.* 1921. Nov. 19. Vol. 77. No. 21. pp. 1641–1643.

The author, aged 40 years, has tested the drug on himself:—Light breakfast, three hours later 3 cc. carbon tetrachloride in hard gelatine capsules—pulse 90. Seven minutes later eructation of carbon tetrachloride and for half an hour a feeling of warmth in the stomach. Forty minutes later pulse 78. An ordinary day's work was done, eating and smoking were not interfered with, and more than the average amount of exercise was taken. There was no constipation, the drug having apparently a mild laxative effect.

Reference is also made in the paper to unpublished work on the treatment of horses and swine, from which it appears that this drug is very effective against blood-sucking strongyles and moderately effective against ascarids.

R. T. L.

LEACH (C. N.). **Carbon Tetrachloride in the Treatment of Hookworm Disease.**—*Jl. Amer. Med. Assoc.* 1922. June 10. Vol. 78. No. 23. pp. 1789–1790.

A trial of this newly discovered anthelmintic was made on 14 selected prisoners at Kandy. In a previous experiment 110 gr. β-naphthol

had been given and an average of eight hookworms recovered; using carbon tetrachloride an average of 58·7 from 14 cases resulted. A dose of 10 cc. produced only slight giddiness and nausea. It was found that this dose, followed a week after by one of 2 cc., removed all hookworms and ascarids. A post-mortem examination showed, however, that it had little or no effect on oxyuris and trichuris, and also that no microscopic changes could be detected in any tissues.

R. T. L.

NICHOLLS (Lucius) & HAMPTON (G. G.). **Treatment of Human Hookworm Infection with Carbon Tetrachloride.**—*Brit. Med. Jl.* 1922. July 1. pp. 8–11.

Experiments were carried out on school children and on agricultural students, and carbon tetrachloride was found to expel hookworms, ascarids, oxyuris (*cf.* LEACH) and trichuris, but it was not so efficient in killing ascarids as oil of chenopodium. The authors suggest the admixture of one part of oil of chenopodium in four parts of carbon tetrachloride for the treatment of ascariasis.

R. T. L.

HAMPTON (G. G.). **Use of Carbon Tetrachloride for Removal of Hookworms in Human Beings. A Preliminary Report.**—*Amer. Jl. Trop. Med.* Baltimore. 1922. Sept. Vol. 2. No. 5. pp. 381–387.

Doses of 3 cc. to 10 cc. were given to 14 prisoners at Kandy jail; no ill-effects were observed, and ascarids and hookworms were passed. Trichocephalus and oxyuris appeared to be unaffected. On post-mortem of an executed criminal who had had 6 cc. of carbon tetrachloride no changes, gross or microscopic, attributable to the drug, were found in the viscera. Twenty students, all positive for hookworm, had each 3 cc. of carbon tetrachloride administered in water. Hookworms were recovered from 19, and a complete cure was effected in 18. Eleven were positive for ascaris, and specimens were passed by six. One was positive for oxyuris and 14 for trichocephalus. No trichocephalus were recovered. An analysis is made of the relative cost and efficiency in Ceylon of carbon tetrachloride and oil of chenopodium in hookworm treatment.

	Cost per lb.	Dose.	Purge.	Percentage Cure.
	s. *d.*			
Oil of chenopodium..	30 0	1·5 cc.	Mag. sulph.	30–50 %
Carbon tetrachloride	3 0	3·0 cc.	None.	90 % (20 cases).

R. T. L.

BAIS (W. J.). **Tetrachloorkoolstof als mijnwormmiddel.** [Carbon Tetrachloride against Hookworms.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1922. Vol. 62. No. 3. pp. 381–393.

Following the suggestions made by HALL (see above), a trial was given by the author to carbon tetrachloride in the treatment of hookworm disease in Javanese coolies in Sumatra.

He administered carbon tetrachloride in a dose of 2·5 cc. in capsules on an empty stomach, followed after two and a half hours by 20 cc. of castor oil. As a standard control a similar cure with 1·4 cc. chenopodium oil was employed.

Chenopodium oil as a first cure expelled 71 per cent. of the total number of worms removed, leaving 29 per cent. to the carbon tetrachloride cure.

If carbon tetrachloride was given first, followed by the chenopodium control, the percentage of worms removed by carbon tetrachloride was 95·2, that expelled by chenopodium oil 4·8 per cent. of the total.

In the first series of experiments (33 patients, average number of worms 311) 6 per cent. of the patients lost no worms by the second cure; in the second series (39 patients, average number of worms 160) 60 per cent. of the patients were free from hookworms after the carbon tetrachloride cure.

The effect of the cure was influenced neither by omission of the laxative (17 patients), nor by administration of the drug without fasting (preceding meal two hours before the cure) to patients.

No untoward effects were noted; the drug is easily taken and very cheap.

W. J. Bais.

MEYER (J. R.) & PESSÔA (Samuel B.). **Estudos dos effeitos toxicos do tetrachloreto de carbono.** [A Study of the Toxic Effects of Carbon Tetrachloride.]—*Brazil Médico.* 1922. Sept. 23. Year 36. Vol. 2. No. 38. pp. 173–179.

Patients to whom large doses of carbon tetrachloride had been given often complained of pain in the loins and sometimes suffered with haematuria.

Experiments with animals were made to test the effects of various doses and methods of administration. The dosage was graded to the body weight, and according as it increased the animals became drowsy, or vomited, or died. The chief alterations were found to be in the liver and kidneys.

The authors cannot agree with the findings of HALL and SHILLINGER [cited by LAKE], who, they say, gave as much as 300 cc. of the drug in a single dose to a dog without toxic effects. In these experiments even 1 cc. produced liver changes in two instances and renal in one.

Their main conclusions are :—

1. The toxic effects begin to manifest themselves even with a small dose—0·05 cc. per kilo body-weight.
2. The changes are most marked in the liver and kidneys, and vary in direct ratio with the age of the experimental animal.
3. The necrosis of the liver cells occurs in the same way as that resulting from chloroform poisoning.
4. Measures tending to prevent absorption by the intestinal mucous membrane [*e.g.*, the use of purgatives] diminish the intensity of the lesions.
5. Though the liver changes appear early, those in the kidneys do so only after a considerable interval, and the latter are the result of the action of the poison in course of elimination.
6. Carbon tetrachloride is a powerful vermifuge; in doses of 0·2 cc. per kilo it expels all the ankylostomes from a dog.
7. Its action may be explained as a direct one on the worm itself.

H. Harold Scott.

ROTH (David A.). **Some Dangers of the Chenopodium Treatment.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1918. Jan.–June. Vol. 11. Pt. 1. pp. 83–91.

Of 103 cases treated with oil of chenopodium which were specially observed, 29 showed symptoms, *e.g.*, dizziness, nausea and vomiting, headache and general depression, and 21 showed deafness. The deafness was by far the most disagreeable after-effect, varying in intensity from very mild to complete loss of hearing lasting from one week to several months. In four cases some deafness persisted after two years. Two of the cases quoted illustrate the important fact that a dose which causes no untoward effects at first may produce the severest type of reaction when repeated within a few days. The author is of opinion that chenopodium is a depressant poison capable of producing serious untoward effects and even death. It should not be administered unless there be ample facilities for study of the cases before and after administration. This should include a careful determination of the percentage of haemoglobin, for it should not be given to those suffering from a high degree of anaemia. The treatment should not be repeated within ten days. During the year 1917 four deaths were noted in the records of Santo Tomas Hospital.

R. T. L.

WALCH (E.). [In Dutch and English.] **Het afdrijvingsvermogen van oleum chenopodii, bereid op de Gouvernements Rubberonderneming Balong. On the Purgative Power of Oleum Chenopodii, manufactured at the Government Rubber Estate, Balong.**—*Meded. Burgerlijk. Geneesk. Dienst. in Nederl.-Indië.* 1920. Pt. 8. pp. 90–119.

The chenopodium oil manufactured at Balong is as efficient as the American commercial product for hookworms and for ascaris. Necators are more sensitive than ankylostomes. The percentage of worms expelled by first treatment is calculated on the method of SCHÜFFNER. Two parallel groups are treated : Group I receives X, followed by A, and Group II A, followed by A or X, where X is the vermifuge being tested and A is a known powerful vermifuge. The author finds it best to give the second cure three days after the first, as the worms are still suffering from the effect of the first dose of anthelmintics and are more susceptible ; and in 3–5 days a considerable production of ova is re-established, showing that the worms are recovering. Enumeration of the ova in a solid mass of faeces " the size of a match-head " is a rough practical guide to the degree of infestation of a group of persons. The single-dose administration of oil of chenopodium is not distinctively more efficient than the divided dose, and is too dangerous for persons not under close observation.

R. T. L.

SCHÜFFNER (W.) & VERVOORT (H.). [In Dutch and English.] **Over de doseering van het Oleum Chenopodii en opmerkingen over de Wormkuur. On the Dosing of the Oleum Chenopodii, and Some Remarks on the Worm Treatment.**—*Meded. Burgerlijk. Geneesk. Dienst. in Nederl.-Indië.* 1921. Pt. 1. pp. 92–109.

It is pointed out that over-dosing with oil of chenopodium has been attributed to the advice of the authors, who state this has occurred because their dosage is based on drops, counted by the International

Drop Counter, giving 40–45 drops per cc., for ethereal oils ; whereas in quoting, minim has been substituted for drops, thus giving 17 per cc. The authors' dose is 1·12–1·14 cc., not 3 cc., and with this dose they have had very few cases of poisoning. Reviewing recent work, they conclude that the oil should be fresh, since the active compound ascaridol diminishes, whilst the toxicity of the drug increases on keeping. 1·2 cc. in divided doses, without a preliminary purge and with but slight starvation, is recommended, and the purge afterwards may safely be omitted. This treatment repeated three days later does not cause cumulative effects, though in weak or anaemic patients five days should elapse and Carlsbad water be taken throughout the period. Sclerosis of kidney or liver predisposes to poisoning with oil of chenopodium.

R. T. L.

GONZAGA (Octavio) & GOMES, Junr. (F. Salles). **A proposito do emprego do oleo de chenopodio.** [The Use of Oil of Chenopodium.]—*Bol. Soc. Med. e Cirug. de S. Paulo.* Brazil. 1922. Feb. Vol. 4. 2nd Ser. No. 12. pp. 302–317.

SMILLIE (Wilson) and others. **A proposito do emprego do oleo de chenopodio. (Continuação da discussão do trabalho dos Drs. O. Gonzaga e F. Salles Gomes, Junior.)**—*Ibid.* pp. 338–342.

Gonzaga devotes several pages to recitals of fatalities after the use of this drug since 1851. Some of them could be accounted for by over-dosage, but not all. The chief danger is that the oil is a mixture in which the constituents may be present in varying proportions [in other words, is not standardized]. Further, the preparation deteriorates with age and can be easily adulterated. Finally, many patients appear to possess an idiosyncrasy for the drug, so that there is no reliable determination of dosage.

Dr. Wilson Smillie agreed that oil of chenopodium is poisonous, but stated that other anthelmintics are toxic also. Ascaridol, the active principle of chenopodium, was mentioned as surpassing the crude drug in certainty and safety of action. In Rio the essence of *Chenopodium anthelminticum* is used in preference to *C. ambrosiodes*, which is reported as being three times as toxic.

Dr. Gomes concluded that practically all the difficulties arose from the variability of the product, and that the proportion of ascaridol present varied between such wide limits as 36 and 98 per cent.

H. Harold Scott.

DE ALMEIDA, Junr. (Theophilo). **O chenopodio e sua toxidez.** [The Toxicity of Oil of Chenopodium.]—*Brazil Medico.* 1922. Feb. 4. Year 36. Vol. 1. No. 5. pp. 60–64.

A large number of quotations are given from the experiences of those engaged in the treatment of helminthiasis with this drug. The author concludes that oil of chenopodium, even in the doses in common use, may cause symptoms of poisoning, also that children are more susceptible than are adults, and, finally, that the chloroform which is often prescribed with the drug, and to which the toxic symptoms have been attributed, is not to be held responsible.

H. Harold Scott.

BARNES (Milford E.). **Death following the Administration of Thymol.** —*Jl. Amer. Med. Assoc.* 1922. Sept. 16. Vol. 79. No. 12. pp. 964–965.

During an anti-hookworm campaign in Siam over 82,000 treatments with thymol for tapeworms have been administered, resulting in only

two fatalities, detailed reports of which are given. In one case a preliminary purge was not taken and the total quantity of the drug (2·6 gm.) was given in a single dose instead of two doses as was the routine practice; the woman died in three hours. She was subject to fainting attacks, and it is suggested that there was some thyroid or cardiac involvement overlooked by the medical officer. The second death was due to pneumonia nine days after administration of 2 gm. of thymol in divided doses; and it was considered that the absorption of the drug was a contributory cause to the development of pneumonia in tuberculous lungs. The death of a coolie is mentioned as following the administration of alcohol by a planter.

R. T. L.

WHELPLY, Junr. (F. R.). **Some Observations on the Treatment of Secondary Anemia, when caused by Infection with** *Ankylostoma duodenalis* [*sic*]. —*China Med. Jl.* 1922. July. Vol. 36. No. 4. p. 301.

During an investigation of efficacy of Blaud's mass in the treatment of secondary anaemia due to ankylostomiasis it was found that the anaemia was accompanied by a diminution of erythrocytes, and this led to a trial of Fowler's solution, but the author does not feel justified in drawing any conclusion at present.

R. T. L.

TREMATODES.

CORT (William W.). **A Study of the Escape of Cercariae from their Snail Hosts.**—*Jl. of Parasit.* 1922. June. Vol. 8. No. 4. pp. 177–184.

FAUST (Ernest Carroll). **The Present State of the Schistosome Problem.**—*China Med. Jl.* 1921. Sept. Vol. 35. No. 5. pp. 405–410.

FAUST (Ernest Carroll). **Notes on South African Larval Trematodes.**—*Jl. Parasit.* 1921. Sept. Vol. 8. No. 1. pp. 11–21. With 1 plate & 1 text fig.

KANTER (Helmuth). **Die Verbreitung der im Menschen parasitierenden Trematoden.**—*Janus.* 1921. May–June. Vol. 25. No. 3. pp. 129–190. With 7 maps.

MILTON (Frank). **The Geographical Distribution of Human Schistosomiasis.**—*Jl. Trop. Med & Hyg.* 1922. Sept. 15. Vol. 25. No. 18. pp. 289–292.

VAN THIEL (P. H.). **Aanteekeningen over** *Agamodistomum anophelis.*—*Tijdschr. v. Vergelijkende Geneesk. enz.* 1922. Aug. 5. Vol. 7. No. 4. pp. 305–318. With 1 plate. [French & English Summaries pp. 318–321.]

TYAU (E. S.). **The Treatment of Asiatic Schistosomiasis.**—*Nat. Med. Jl. China.* 1922. June. Vol. 8. No. 2. pp. 83–85.

CESTODES.

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NOTICE.

THE LATE NORTH PERSIAN FORCES.

We have been asked by the War Office to announce the institution of a Memorial Trust Fund, commemorative of the services of the late North Persian Forces, which has been subscribed by Officers of the Royal Army Medical Corps and Indian Medical Service who served with these Forces.

In accordance with the desire of the subscribers to encourage the study of Tropical Medicine and Tropical Hygiene it has been decided that the Memorial should take the form of a silver medal, to be known as the "North Persian Forces Memorial Medal," to be awarded annually for the best paper on Tropical Medicine or Tropical Hygiene published in any Journal during the twelve months ending 31st December by any Medical Officer, of under twelve years' service, of the Royal Navy, Royal Army Medical Corps, Royal Air Force, Indian Medical Service, or of the Colonial Medical Service.

The first award will be for the best paper published during the twelve months preceding 31st December 1923.

The award will be announced in the latter part of the year following that in which the paper was published, provided that the Memorial Committee consider the papers published to have attained a standard of merit justifying an award.

REVIEWS AND NOTICES.

BRUMPT (E.) [Membre de l'Académie de Médecine, Professeur à la Faculté de Médecine de Paris, Secrétaire général de l'Institut de Médecine coloniale.] **Précis de Parasitologie.** 3rd edition, entirely revised. xv + 1,216 pp. With 736 figs. in text and 5 plates. 1922. Paris: Masson et Cie., 120, Boulevard Saint-Germain. [Price 50 francs.]

Though this new edition of Brumpt's well-known Précis has been revised and refreshed (to the extent of 200 pages) with new matter, its bulk is hardly increased and its quality and proportion are unchanged. The author still adheres to the plan of concentrating powerfully on the individual parasites—their morphology, biology, pathogeny, and pathological effects on man—and, while ever giving vigilant attention to practical ends like prophylaxis, clinical diagnosis, treatment, etc., of keeping all these things in proper subordination to the main theme; so that in its new edition the book maintains its reputation as one of the most concise and trustworthy textbooks to which the student of the subject can be referred.

To say that from the standpoint of the medical profession this book—speaking for the present of its first 950 pages, which include all the parasitic animals—is all that can be desired is not to deny that the exacting eye of the zoologist, and even more the fastidious eye of the specialist in some particular animal group, may descry some spots in it. To the zoologist the dichotomy of Metazoa into Zoophytes having a radiate arrangement and Artiozoa having bilateral symmetry, the definition of Protozoa as "unicellular beings capable of movement during part of their existence," and the unquestioned inclusion of spirochaetes in the animal kingdom, will appear blots of unhappy superfluity. The protozoologist will probably object to a somewhat arbitrary application of specific and generic names, to the unqualified association of Blastocystis with Flagellata, and to a proscenium that permits Haemoproteus and Leucocytozoon to appear on the stage but keeps Proteosoma behind the curtain, or that, admitting Haemoproteus, leaves unspoken its principal speech relating to MACCALLUM's discovery of the significance of exflagellation. The Helminthologist will wonder why leeches are interpolated between flatworms and roundworms, or indeed what they are doing in that gallery at all. The Entomologist may complain of some of the unnecessarily-complicated taxonomic tables, especially the one for distinguishing anopheline genera; and although he will not have anything to say—except on the score of unnecessary inconvenience—against treating blood-sucking lice as Rhynchota, he will object with reason to the unnatural inclusion of fleas in the Dipterous order.

The practical needs of the parasitologist, however, are not at every point those of the zoologist, and a little weakness in some of the zoological articulations does not in the reviewer's opinion—and others whose judgment in such matters cries in the top of his—affect the solid value and great practical utility of this admirable Précis.

A. Alcock.

Troisième partie. Étude systématique des Végétaux parasites (à l'exclusion des Bactéries) et des Mycoses ou maladies qu'ils occasionnent. pp. 951–1182.

In the new edition of BRUMPT's text-book the section dealing with the human mycoses occupies nearly one-fifth of the whole. The diseases are grouped according to the organisms causing them, and the latter are fully described.

In his systematic arrangement of the Imperfect Fungi the author, like most French parasitologists, follows the terminology of VUILLEMIN.

The asexual forms of reproduction, other than spores developed in special receptacles, such as pycnidia, are grouped in four categories—conidia, thallospores, hemispores, and aleuria—and the Hyphomycetes are classified according to these spore types and their sub-divisions.

It is unfortunate, from one point of view, that this classification, which is not followed by many French mycologists and has made no way in any other country, should have been adopted. The ordinary systematic mycologist desirous of becoming acquainted with the work on human parasites of the French specialists who are the acknowledged leaders in this field, finds himself in a new world, using a mycological language which he cannot understand. All his standard text books and guides have to be cast aside, and he is forced to learn a new classification in which the Arthrosporae have to be distinguished from the Blastosporae and the Sporophorae from the Phialidae. Even in the sections dealing with pathogenic Phycomycetes, Ascomycetes, etc., the generic names to which one is accustomed are replaced by other, less usual ones. *Actinomyces* becomes, not *Nocardia*, which has found a somewhat wide acceptance in France, but *Discomyces*. The ascigerous form of *Sterigmatocystis* is *Diplostephanus* as distinct from the *Eurotium* of *Aspergillus*; *Mucor corymbifer* is *Lichtheima corymbifera*; *Penicillium brevicaule* is *Scopulariopsis brevicaulis*, and so on. Setting aside the very open question of the validity of these changes, one may be permitted to doubt their expediency, since they have not yet been accepted by the general body of systematists.

These criticisms apart, and after all they concern only one mycologist, who regrets the ever-widening gap between the pure science and its application to the study of a great group of human afflictions, the book gives perhaps the best account of the mycoses as a whole that has yet appeared. The descriptions are admirably clear and concise, the illustrations well selected and beautifully reproduced. The work is thoroughly up to date, some mycoses described as late as the middle of 1922 being included, as, for instance, the Sporotrichosis due to *S. Carougeaui*. This, by the way, is the only species retained in the genus *Sporotrichum*, the rest following *S. Beurmanni* to the genus *Rhinocladium*. The view of Davis (*University of Wisconsin Studies in Science*, 2, pp. 104–130, 1921) that probably all the Sporotrichoses, and certainly the common European and North American forms, are due to a single fungus, *S. Schenckii*, is not mentioned, though the evidence advanced by him appears to be conclusive.

Special attention is called to the frequent indications of a saprophytic life of the fungi parasitic on man. The readiness with which many of them can be grown on various artificial media, the known occurrence as saprophytes in nature of species of *Aspergillus*, *Penicillium*, *Hemispora*, *Rhinocladium*, etc., that can cause mycoses, and the probability of a similar origin of some Actinomycetic infections are all evidences of this.

E. J. Butler.

Spittel (R. L.) [F.R.C.S.(Eng.). Surgeon, General Hospital, Colombo; General Officer in charge of Venereal Clinic, General Hospital, Colombo; Lecturer in Clinical Surgery, Ceylon Medical College.] **Framboesia Tropica (Parangi of Ceylon).**—pp. iv + 59. With 39 text figs. 1923. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C.2. [Price 5*s*. net.]

The author claims this monograph "to be nothing more than a clinical study of framboesia as met with in Ceylon." It is, however, one of the best clinical accounts of yaws yet published. The descriptive text is so well balanced and the photographic illustrations so excellent that the reader cannot fail to obtain a real picture of the disease, a thing not always obtained from textbook descriptions. The author is enthusiastic in his attacks upon those who still waver over accepting the separate

entities of framboesia and syphilis, and at the same time does not hesitate to assert a framboesial pathogeny for the bone and joint lesions, gummata of soft parts, etc., which have been rather tentatively described under yaws, or to include juxta-articular nodules, gangosa, and what from the photograph would appear to be the localized leucoderma described by ZIEMANN in West Africa under the name "Melung."

The reviewer has been particularly struck thoughout by the fact that the disease framboesia as described in Ceylon is identical with this disease studied in Africa some fifteen years ago in every detail. As the author observes, "the disease breeds true," and clinically there should be never any difficulty in making a differential diagnosis between yaws and syphilis.

At the same time we are confronted with the fact that on the one hand it is practically impossible to distinguish the two specific spirochaetes from one another, or the two diseases by means of complement deviation tests, and on the other hand that the causal parasite has not been demonstrated in many of the lesions ascribed to framboesia. These are points which deserve the attention of the tropical pathologist, as not until these problems have been more fully investigated will the subject of yaws be established on an unassailable basis.

Attention is drawn by Dr. Spittel to the local distribution of yaws among scattered forest settlements rather than among town-dwelling populations, a fact which accounts for cases being overlooked and the geographical distribution of framboesia curtailed. The part played by flies in spreading infection by contamination is emphasized. The descriptions of the several eruptions, besides that which gives the disease its name, are very good, and it is interesting to note that this observer in Ceylon failed to see any lesions of mucous membranes. The same experience fell to the lot of the reviewer in Africa and he remains a little sceptical of their occurrence though mentioned in text-books. The author in speaking of the distribution of the framboesiform nodules mentions the "predilection for the flexures such as the axilla," thus rightly correcting a contrary statement which had crept into some books.

There is a full account of the so-called tertiary affections, gummatous nodules, bony changes and ulcerations, and as above mentioned, the conditions known as gangosa and juxta-articular nodules. With regard to the nervous system in framboesia the author preserves a non-committal attitude, such symptoms as he has observed being those rather of a transient toxic effect than of any organic lesion. At the same time he says, "It is highly probable that the nervous system is slightly touched at one stage of parangi. The disease bears too close a resemblance to syphilis for this not to be so," and brings as further evidence in favour of this rather unsatisfactory statement the results of the examination of the cerebro-spinal fluid in nine cases of secondary and five cases of tertiary yaws. "All the former gave negative Wassermann reactions except one, which gave a very weak positive to a provocative test; but two of the tertiary cases gave weak positive reactions. No globulin increase or pleocytosis has yet been observed." Results which will scarcely impress the reader.

Treatment is dealt with fully and a word of warning is uttered about expecting too much from one or two salvarsan injections. The immediate results are often nothing short of miraculous and the delighted patient is liable to take himself off, but we know that, in some such cases at all events, recrudescence occurs, and probably much work and careful record-keeping will be necessary before an assured method of treatment is established.

Hugh S. Stannus.